UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

In re RAIL FREIGHT FUEL SURCHARGE ANTITRUST LITIGATION	MDL Docket No. 1869 Miscellaneous No. 07-0489 (PLF) [UNDER SEAL]
This document relates to: ALL DIRECT PURCHASER CASES	

OPINION

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PART ONE: INTRODUCTION AND BACKGROUND

I. INTRODUCTION

This matter is again before the Court on a motion of the direct purchaser plaintiffs for class certification under Rule 23 of the Federal Rules of Civil Procedure. The Court previously certified the class in 2012. See In re Rail Freight Fuel Surcharge Antitrust Litig., 287 F.R.D. 1, 74 (D.D.C. 2012) ("Rail Freight III"). On appeal, the United States Court of Appeals for the District of Columbia Circuit vacated this Court's prior decision and remanded for further consideration in light of intervening Supreme Court precedent in Comcast Corp. v. Behrend, 569 U.S. 27 (2013). In re Rail Freight Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d 244, 255 (D.C. Cir. 2013). After remand, this Court permitted the filing of extensive supplemental memoranda of law, the submission of additional and supplemental expert reports, and the taking of additional depositions of expert witnesses. See Stipulation and Order (Oct. 31, 2013) at 1-3 [Dkt. 694]; Scheduling Order (June 19, 2015) at 1-2 [Dkt. 772]. It also asked the parties to submit a joint statement of the legal issues to be addressed at the class certification hearing, see Order (Aug. 21, 2014) at 1-2 [Dkt. 725], which they did. Thereafter, the Court delayed the class certification hearing and its decision until after the Supreme Court decided Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. 1036 (2016), and requested supplemental briefing on the impact of the Tyson Foods decision on the class certification questions in this case. See Order (Sept. 28, 2015) at 1-2 [Dkt. 785]. The Court held a class certification hearing spanning five days, with oral argument on the motion and expert testimony, on September 26-30, 2016.

Upon consideration of the parties' papers, the testimony and reports of the expert witnesses, the oral arguments presented by counsel, the relevant legal authorities, and the extensive record in this case, the Court concludes that plaintiffs have failed to establish by a

preponderance of the evidence that all of the requirements of Rule 23 of the Federal Rules of Civil Procedure have been satisfied. Specifically, plaintiffs have failed to establish that "questions of law or fact common to class members predominate over any questions affecting only individual members" under Rule 23(b)(3). FED. R. CIV. P. 23(b)(3). While the documentary evidence is strong evidence of conspiracy and class-wide injury to so-called carload traffic, the damages regression model of plaintiffs' lead expert is flawed for three reasons: (1) a large portion of the class traffic reflected in his damages model was intermodal traffic — not carload traffic — that was subject to competitively negotiated fuel surcharge formulas established during the pre-class period and which never changed; (2) his damages model finds unexplainable overcharges with respect to legacy shippers — the very concern raised by the D.C. Circuit in its opinion in this case; and (3) there are too many uninjured shippers in the class who cannot be identified or sufficiently explained to satisfy the "all or virtually all" standard for predominance under Rule 23(b)(3) and the established case law. The Court therefore will deny the direct purchaser plaintiffs' motion for class certification.[1]

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[1] The papers reviewed in connection with the pending motion include the following:

Class Certification. The second consolidated amended class action complaint ("2d Am. Compl.") [Dkt. 324]; the direct purchaser plaintiffs' motion for class certification ("Class Mot.") [Dkt. 337]; the direct purchaser plaintiffs' memorandum in support of motion for class certification ("Class Mem.") [Dkt. 337-9]; exhibits A through D submitted in support of the direct purchaser plaintiffs' motion for class certification; exhibits 1 through 224 submitted in support of the direct purchaser plaintiffs' motion for class certification (individually, "RD Ex."); the Corrected Expert Report of Gordon Rausser ("Rausser Class Rep."); the Corrected Expert Reply Report of Gordon Rausser ("Rausser Class Reply") [Dkt. 449]; Defendants' Memorandum of Law in Opposition to Plaintiffs' Motion for Class Certification ("Class Opp.") [Dkt. 381]; the 21 declarations and their accompanying exhibits submitted in support of defendants' memorandum of law in opposition to the direct purchaser plaintiffs' motion for class certification; exhibits 1 through 51 submitted in support of defendants' memorandum of law in opposition to the direct purchaser plaintiffs' motion for class certification (individually, "PD Ex."); Plaintiffs' Reply Memorandum in Support of their Motion for Class Certification ("Class Reply") [Dkt. 406]; exhibits 1 through 150 submitted in support of the direct purchaser

plaintiffs' reply memorandum in support of their motion for class certification (individually, "HD Ex."); Plaintiffs' Memorandum Addressing Wal-Mart Stores, Inc. v. Dukes ("Pls. Wal-Mart Br.") [Dkt. 523]; Defendants' Supplemental Memorandum Concerning Wal-Mart Stores, Inc. v. Dukes et al. ("Defs. Wal-Mart Br.") [Dkt. 524]; Plaintiffs' Supplemental Memorandum of Law in Support of Motion for Class Certification ("Pls. Supp. Mem.") [Dkt. 704]; exhibits 1 through 132 submitted in support of the direct purchaser plaintiffs' supplemental memorandum in support of their motion for class certification (individually, "TD Ex."); the Supplemental Expert Report of Gordon Rausser ("Rausser Supp. Rep.") [Dkt. 704-1]; the Expert Report of James T. McClave ("McClave Merits Rep.") [Dkt. 704-69]; the Expert Reply Report of Gordon Rausser ("Rausser Merits Reply") [Dkt. 704-96]; the Expert Report of Gordon Rausser ("Rausser Merits Rep.") [Dkt. 704-98]; Defendants' Memorandum of Law in Opposition to Plaintiffs' Renewed Motion for Class Certification ("Defs. Supp. Opp.") [Dkt. 707]; exhibits 1 through 31 submitted in support of defendants' supplemental opposition to the direct purchaser plaintiffs' motion for class certification (individually, "OD Ex."); the Corrected Expert Report of Joseph P. Kalt ("Kalt Merits Rep.") [Dkt. 707-13]; the Corrected Declaration of Joseph P. Kalt ("Kalt Class Rep.") [Dkt. 709-3]; Plaintiffs' Supplemental Reply Memorandum of Law in Support of Motion for Class Certification ("Pls. Supp. Reply") [Dkt. 711]; the Supplemental Expert Reply Report of Gordon Rausser ("Rausser Supp. Reply") [Dkt. 711-1]; the Supplemental Expert Report of James T. McClave ("McClave Supp. Rep.") [Dkt. 711-2]; Defendants' Sur-Reply Memorandum in Opposition to Plaintiffs' Motion for Class Certification ("Defs. Sur-Reply") [Dkt. 720]; the Sur-Reply Declaration of Joseph P. Kalt ("Kalt Class Sur-Reply") [Dkt. 720-1]; the Expert Report of Jeffrey Leitzinger ("Leitzinger Rep.") [Dkt. 760-1]; the Corrected Expert Report of Dennis W. Carlton ("Carlton Rep.") [Dkt. 783-1]; Defendants' Memorandum Regarding Tyson Foods, Inc. v. Bouaphakeo ("Defs. Tyson Foods Mem.") [Dkt. 799]; and Plaintiffs' Memorandum of Law Addressing Tyson Foods, Inc., v. Bouaphakeo ("Pls. Tyson Foods Mem.") [Dkt. 800].

Daubert. The Court reviewed the following in connection with the admissibility, under Daubert, of the proffered expert reports and the expert testimony of the five experts in this case: Plaintiffs' Memorandum of Law in Support of Motion to Exclude Opinions Offered by Dr. Joseph Kalt ("Kalt Daubert Mot.") [Dkt. 774-1]; exhibits 1 through 15 submitted in support of plaintiffs' motion to exclude Dr. Kalt; Defendants' Memorandum of Law in Opposition to Plaintiffs' Motion to Exclude Opinions Offered by Dr. Joseph Kalt ("Kalt Daubert Opp.") [Dkt. 777]; and exhibits 1 through 27 submitted in support of defendants' opposition to plaintiffs' motion to exclude Dr. Kalt. The Court also reviewed all of the expert reports in support of and in opposition to class certification.

Motions Hearing and Related Submissions. The Court also reviewed the transcripts of the motions hearing of September 26-30, 2016, and the binders of materials, consisting of demonstratives, exhibits, and expert reports and deposition excerpts, submitted by the parties at the hearing. The Court also reviewed all of the exhibits admitted into evidence at the 2016 hearing and will refer to the direct purchaser plaintiffs' exhibits as "Pls. Ex." and to defendants' exhibits as "Defs. Ex." The hearing transcripts will be cited by date and page.

II. BACKGROUND

The Court has discussed the factual and procedural background of this case in prior decisions. See In re Rail Freight Fuel Surcharge Antitrust Litig., 587 F. Supp. 2d 27, 29-31 (D.D.C. 2008) ("Rail Freight I"); In re Rail Freight Fuel Surcharge Antitrust Litig., 593 F. Supp. 2d 29, 32, 34-35 (D.D.C. 2008) ("Rail Freight II"), aff'd, Fayus Enters. v. BNSF Ry. Co., 602 F.3d 444, 445-46, 454 (D.C. Cir. 2010); Rail Freight III, 287 F.R.D. at 11-20. It therefore will limit its discussion here accordingly.

This case involves the claim that defendants — BNSF Railway Company ("BNSF"); CSX Transportation, Inc. ("CSX"); Norfolk Southern Railway Company ("NS"); and Union Pacific Railroad Company ("UP") — engaged in a price-fixing conspiracy to coordinate their fuel surcharge programs as a means to impose supra-competitive total price increases on their shipping customers. See 2d Am. Compl. ¶¶ 1-2. A rail fuel surcharge ("FSC") "is a separately-identified fee that is charged by the railroads for . . . agreed-upon transportation [services], purportedly to compensate for increases in the cost of fuel." Id. ¶ 2. Plaintiffs allege, however, that the four defendants, through their collective action, "conspired to impose Rail Fuel Surcharges that far exceeded any increases in the Defendants' fuel costs, and thereby collected billions of dollars of additional profits during the . . . conspiracy." Id.

Plaintiffs have been divided into two putative classes: (1) the direct purchasers — those who allegedly purchased rail freight transportation from defendants from July 1, 2003, until December 31, 2008, and who were assessed a rail fuel surcharge for the transportation; and (2) the indirect purchasers — those who allegedly purchased rail freight transportation services

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As directed by the court of appeals, see In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 255, the record before the Court at the time of the initial class certification has also been considered. See Rail Freight III, 287 F.R.D. at 10 n.1.

indirectly from defendants. See Rail Freight III, 287 F.R.D. at 12. Plaintiffs in both putative classes allege that defendants violated Section 1 of the Sherman Act, 15 U.S.C. § 1, by conspiring to fix prices through the use of fuel surcharges, and seek recovery under Section 4 of the Clayton Act, 15 U.S.C. § 15. See Rail Freight I, 587 F. Supp. 2d at 29; 2d Am. Compl. ¶ 33.

In 2008, defendants moved to dismiss the claims of both putative classes. On November 7, 2008, the Court denied defendants' motion regarding the direct purchaser plaintiffs, concluding that the direct purchasers had sufficiently alleged an agreement in restraint of trade. See Rail Freight I, 587 F. Supp. 2d at 32. Shortly thereafter, on December 28, 2008, the Court denied in part and granted in part defendants' motion regarding the indirect purchaser plaintiffs, concluding that the indirect purchasers' state law claims were preempted and must be dismissed, but that the indirect purchasers' federal antitrust claim for injunctive relief could proceed. See Rail Freight II, 593 F. Supp. 2d at 32, 43. The court of appeals affirmed this Court's dismissal of the indirect purchasers' state law claims. See Fayus Enters. v. BNSF Ry. Co., 602 F.3d at 454.

The direct purchaser plaintiffs (hereinafter, "plaintiffs" unless otherwise specified) have moved for class certification. The parties no longer dispute the class definition previously accepted by this Court. See infra at 110-11. The Court therefore will consider here whether, under Rule 23 of the Federal Rules of Civil Procedure, to certify a class of:

> All entities or persons that at any time from July 1, 2003 until December 31, 2008 ("the Class Period") purchased rate-unregulated rail freight transportation services directly from one or more of the Defendants, as to which Defendants assessed a stand-alone rail freight fuel surcharge applied as a percentage of the base rate for the freight transport (or where some or all of the fuel surcharge was included in the base rate through a method referred to as "rebasing") ("Fuel Surcharge").
>
> Excluded from this Class definition are (a) Defendants, any subsidiaries or affiliates of Defendants, any of Defendants' co-conspirators, whether or not named as a Defendant in the

> Complaint, and all federal governmental entities, and (b) all entities or persons that paid a Fuel Surcharge directly to any of the Defendants solely pursuant to a railroad-shipper contract that was (i) entered into before July 1, 2003, and (ii) provided for a stand-alone Fuel Surcharge to be paid under a predetermined formula specifically set forth in the contract.

Class Mot. at 1 & n.1. This Court previously designated the eight named plaintiffs — Dust Pro, Inc.; Carter Distributing Company; Dakota Granite Company; Donnelly Commodities, Inc.; U.S. Magnesium LLC; Nyrstar Taylor Chemicals, Inc.; Olin Corporation; and Strates Shows, Inc. — as class representatives, and designated Quinn Emanuel Urquhart & Sullivan, LLP and Hausfeld LLP, as co-lead counsel. Rail Freight III, 287 F.R.D. at 74. Those designations also are no longer in dispute. See infra at 115. On remand, plaintiffs again request that this case be certified as a class action for litigation and trial of plaintiffs' claim for price fixing under Section 1 of the Sherman Act, 15 U.S.C. § 1, and defendants oppose plaintiffs' motion for class certification, arguing primarily that plaintiffs have failed to satisfy the predominance requirement of Rule 23(b)(3).

A. The Alleged Conspiracy

Plaintiffs allege that in early 2003 defendants entered into a conspiracy to increase their total revenues through the use of standardized, uniform, and supra-competitive fuel surcharges. Rail Freight I, 587 F. Supp. 2d at 29-30. These defendants are the four largest Class I railroads, which are defined by the Surface Transportation Board ("STB") as having annual carrier operating revenues of at least $250 million. Rausser Merits Rep. at 26; see also 2d Am. Compl. ¶ 1. The four Class I railroads control about 90% of rail freight track miles and account for 94% of all rail freight revenue in the continental United States. See 2d Am. Compl. ¶ 4;

Rausser Merits Rep. at 26. BNSF and UP operate in the western United States; CSX and NS operate in the east. See Rausser Merits Rep. at 38.

The defendant railroads are part of a large, integrated system. Class I railroads typically perform long-haul movement — moving shipments over long distances. See Rausser Merits Rep. at 30. Smaller regional and short-line railroads depend on interchanging traffic with larger Class I railroads. See id. at 47. There are two basic types of rail traffic: intermodal traffic and carload traffic. See Class Opp. at 14 n.19; Class Certification Hr'g Tr. (Sept. 26, 2016) at 183-84. As defendants define it, intermodal traffic travels by rail and one other mode of transportation such as truck or ship. Class Certification Hr'g Tr. (Sept. 26, 2016) at 186. "All other rail traffic is known as 'carload' traffic." Class Opp. at 14 n.19. Each railroad has a different published fuel surcharge formula for carload and intermodal traffic. Class Certification Hr'g Tr. (Sept. 26, 2016) at 188.

Before Congress passed the Staggers Rail Act of 1980, defendants would have had to apply to the Interstate Commerce Commission for approval of an across-the-board rate increase. Rail Freight I, 587 F. Supp. 2d at 29-30. Following the deregulation of the railroad industry, at least 80% of all rail shipments now move under private transportation contracts, which are not rate regulated, or are otherwise exempt from rate regulation. Id. Plaintiffs allege that defendants determined that the most efficient way to increase their profits was through the imposition of "an across-the-board artificially high and uniform fuel surcharge," instead of attempting to renegotiate all of their individual contracts, see id. at 30, or attempting to fix each base rate separately, which plaintiffs say "would have been extremely complex, very costly, and effectively unmanageable." Rausser Merits Rep. at 52 n.94.

The total freight price for a shipping customer, called the "all-in rate," consists of a base rate and a fuel surcharge applied as some percentage of the base rate. See Class Opp. at 3; Rausser Merits Rep. at 76. The base rate incorporates fixed costs such as the costs of organizing a particular shipment; building and maintaining railroad tracks, bridges, and other structures; and the railroad's markup of price over costs. Rausser Merits Rep. at 76. Plaintiffs allege that defendants imposed "an across-the-board artificially high and uniform fuel surcharge" as a percentage multiplier of the base rate, thereby permitting defendants "to raise total freight prices widely by a given percentage." Rail Freight I, 587 F. Supp. 2d at 30. In effect, according to plaintiffs, the allegedly conspiratorial fuel surcharges operated like a tax, increasing the total price of shipping by a set percentage. Rausser Merits Rep. at 112-13. Plaintiffs contend that this "approach yielded defendants billions of dollars of additional profits because the surcharge raised rates far beyond the real increased cost of fuel." Rail Freight I, 587 F. Supp. 2d at 30.

Plaintiffs maintain that it took defendants some trial and error to reach the point of conspiracy. Before the class period, plaintiffs say that defendants "operated as a price-discriminating, interdependent, but non-collusive oligopoly." Class Mem. at 8. And for many years before the class period, defendants "confronted a long-term, structural decline in rail freight rates." Id. "Between 2000 and early 2003, the three-year period preceding the Class Period," plaintiffs contend that defendants "unilaterally took various actions designed to increase rail freight prices and revenues." Id. at 9. As plaintiffs describe it, "[t]hese uncoordinated actions included, among other things, unilateral attempts to apply stand-alone fuel surcharges, which were designed to take advantage of future rising fuel prices and intended as revenue enhancement steps." Id. (internal quotation marks and citations omitted). But plaintiffs contend that defendants "acting on their own had limited success when trying to boost revenues through

fuel surcharges." Id.; see Pls. Supp. Reply at 2. Plaintiffs contend that these pre-class period "fuel surcharges were applied only sporadically to a limited number of shippers," because defendants were concerned about competition — "losing business to other [railroads] that did not apply fuel surcharges." Class Mem. at 9-10; see Pls. Supp. Reply at 1.

According to plaintiffs, another barrier to broad application of fuel surcharges prior to the alleged conspiracy was the wide use of "the so-called Rail Cost Adjustment Factor, or 'RCAF.'" Class Mem. at 11. The RCAF "is a weighted index that accounts for all significant input costs, including fuel." Id. Plaintiffs assert that wide use of the RCAF impeded broad application of fuel surcharges because defendants "recognized that imposing a stand-alone fuel surcharge where fuel price increases were already covered by the RCAF would be perceived by shippers as double dipping." Id. (internal quotation marks omitted).

Plaintiffs contend that beginning in the spring of 2003 "the four Defendants agreed to create and apply a common Fuel Surcharge" — linked to the price of oil on one of two oil indexes, the On-Highway Diesel Fuel ("HDF") index or the West Texas Intermediate ("WTI") index — "based on a percentage of base rates on an across-the-board basis to all members" of plaintiffs' putative class. Class Mem. at 19. Under CSX's new, allegedly conspiratorial fuel surcharge program, the railroad would assess a 0.4% surcharge when the price of oil on the WTI index exceeded $23 per barrel, and an additional 0.4% for every dollar above $23. Id. Plaintiffs say that "[u]nlike its predecessor program, which required the price of oil to exceed the threshold price ($28 per barrel under the old program) for 30 consecutive days, CSX's new program would be based on the average price of oil from the preceding month." Id. at 19-20. And plaintiffs allege that BNSF, UP, and NS adopted "essentially uniform" programs,

and all four defendants "remained in synch throughout the Class Period." Id. at 24. As plaintiffs describe it,

> [t]he only differences in the Defendants' programs concerned the indices used and the thresholds chosen. The two indices chosen were closely related. The western railroads (BNSF and the UP) linked their fuel surcharge to the on-highway diesel fuel (HDF) index, whereas the eastern railroads (CSX and NS) linked their fuel surcharge to the West Texas Intermediate (WTI) index.

Id. at 24 n.76 (quoting Rausser Class Rep. at 54-55); see also Rausser Merits Rep. at 118. Although UP and BNSF used slightly different thresholds in their fuel surcharge programs, plaintiffs assert that this difference "had no practical effect":

> The UP applied a fuel surcharge when the HDF was above the threshold of $1.35 per gallon and the BNSF applied a Fuel Surcharge when the HDF index was above $1.25 per gallon. CSX and NS both applied fuel surcharges when the WTI index was above $23 per barrel. The different thresholds used by UP and BNSF were not relevant to fuel surcharge amounts during the class period, because the indices were all above the threshold values for the entire Class Period. Consequently, the UP and BNSF Fuel Surcharge programs provided for identical fuel surcharge percentages once the $1.35 threshold was reached.

Class Mem. at 24 n.76 (quoting Rausser Class Rep. at 55); see also Rausser Merits Rep. at 119.

The next step in the alleged conspiracy, according to plaintiffs, was defendants' agreement and collective action to cause the American Association of Railroads ("AAR") to create a new cost escalation index, the All-Inclusive Index Less Fuel ("AIILF"), which removed fuel costs from the prior cost escalation index, the All-Inclusive Index ("AII"), upon which the RCAF was based. See Rail Freight I, 587 F. Supp. 2d at 30; see Class Mem. at 27-28. Plaintiffs maintain that defendants reached this agreement during the October and December 2003 meetings of the AAR; the AIILF index was published in December of 2003. Rail Freight I, 587

F. Supp. 2d at 30; see Class Mem. at 29. They point to a letter written by BNSF's chief economist, Sam Kyei, in which he stated:

> In December 2003 [Matt Rose, BNSF's chief executive officer], single-handedly got the A.A.R. to establish a non-fuel RCAF index, now called the All-Inclusive Index Less Fuel . . . . In my 18-year railroad career, no one had ever succeeded in steering the A.A.R. to do this. . . . [T]he combination of sound price escalation using this index and a fuel surcharge should tremendously help our bottom-line for years to come. In fact, . . . the entire rail industry should benefit from the escalation options the index provides.

Class Mem. at 29-30 (quoting RD Ex. 122, Letter from Sam Kyei, to Matt Rose (Mar. 15, 2005), at BNSF-0070502).

At this point, plaintiffs allege that defendants, having coordinated their fuel surcharges and created and published the AIILF, "worked tirelessly to achieve 100% Fuel Surcharge coverage across their customers." Class Mem. at 31. Plaintiffs say that following defendants' agreement to coordinate their fuel surcharges, defendants' fuel surcharge revenue "skyrocketed." Id. at 42. For example, plaintiffs state that NS saw fuel surcharge revenue for certain businesses "grow exponentially from about $11.6 million in 2002, to about $61.7 million, $208 million, $650 million, and $974 million in 2003, 2004, 2005, and 2006, respectively." Id. at 42-43. Plaintiffs say that because of the conspiracy, defendants "were able to reverse the long-term downward trend in rail freight rates and move rates sharply upward," id. at 43, at the expense of putative class members. Id. at 45.

B. Appeal to the D.C. Circuit

Based on the allegations in the Second Consolidated Amended Class Action Complaint, the record, the arguments presented by counsel, and the existing case law regarding class certification, the Court certified the plaintiffs' class in 2012. Rail Freight III, 287 F.R.D. at

10. Defendants sought an interlocutory appeal before the court of appeals. In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 247. Before the D.C. Circuit issued its opinion, the Supreme Court decided Comcast Corp. v. Behrend, 569 U.S. 27. The D.C. Circuit concluded that an interlocutory appeal was appropriate under Rule 23(f) of the Federal Rules of Civil Procedure in light of the Supreme Court's decision in Comcast, which vacated the Third Circuit decision relied on by this Court in its class certification opinion. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 250-51, 253-54; Rail Freight III, 287 F.R.D. at 26, 62, 69. The D.C. Circuit also pointed to potential pressure on defendants to settle and an "identified defect" in the damages model offered by plaintiffs' expert, Dr. Gordon Rausser. In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 251-52, 254.

Defendants argued to the D.C. Circuit that Dr. Rausser's damages model quantifies injury for all shippers, including so-called "legacy shippers," shippers who, as they describe, "were bound by rates negotiated before any conspiratorial behavior was alleged to have occurred." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252. The D.C. Circuit concluded that this Court had not addressed "the defendants' concern that the damages model yielded false positives with respect to legacy shippers," and that the Supreme Court's recent Comcast decision "sharpens the defendants' critique of the damages model as prone to false positives." Id. at 253; see also id. at 254.

In its initial opinion, this Court also relied on Mims v. Stewart Title Guaranty Co., 590 F.3d 298, 308 (5th Cir. 2009), and Kohen v. Pacific Investment Management Co., 571 F.3d 672, 677 (7th Cir. 2009), for the proposition that class certification is not precluded "simply because a class may include persons who have not been injured by the defendants' conduct."

Rail Freight III, 287 F.R.D. at 40. The D.C. Circuit stated in reference to those decisions that "Rule 23 not only authorizes a hard look at the soundness of statistical models that purport to show predominance — the rule commands it." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 255. The court of appeals vacated this Court's decision and remanded to permit it to consider defendants' arguments regarding false positives and legacy shippers in the first instance in light of Comcast. Id. at 254-55. Consistent with the D.C. Circuit's mandate, the Court will address the changes to the Rule 23(b) predominance requirement after Comcast and conduct a rigorous analysis of plaintiffs' and defendants' submissions regarding legacy shippers.

C. Class Certification Papers and Supplemental Briefing Before the Class Certification Hearing

To obtain class certification, plaintiffs must satisfy the four threshold requirements of Rule 23(a) — commonly referred to as numerosity, commonality, typicality, and adequacy — and the two additional requirements of Rule 23(b)(3) — predominance and superiority. See FED. R. CIV. P. 23(a)-(b). The central question before the Court relates to predominance: whether plaintiffs have met their burden to show that "questions of law or fact common to class members predominate over any questions affecting only individual members." FED. R. CIV. P. 23(b)(3); see Comcast Corp. v. Behrend, 569 U.S. at 33. That question, in turn, focuses on whether plaintiffs have shown that the harm — that is, the impact — from the alleged conspiracy is capable of proof at trial through evidence that is common to the class rather than specific to its individual members. See Comcast Corp. v. Behrend, 569 U.S. at 33; In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252.

On October 15, 2013, the Court heard argument on the parties' respective views on the scope of the remand in light of the D.C. Circuit's decision. The Court determined that the "D.C. Circuit neither explicitly nor implicitly restricted the scope of the remand to any single, narrow issue." Order (Oct. 16, 2013) at 2 [Dkt. 691]. The Court therefore permitted briefing on any issues that the parties believed would affect this Court's determination of whether plaintiffs have established that injury and damages could be established through common proof on a class-wide basis. Id. Specifically, the Court asked the parties to address, at a minimum, the following issues in supplemental briefing:

> (1) Whether [Comcast] and the D.C. Circuit's remand decision establish a more demanding standard for evaluating expert proof of class-wide injury than the standard previously applied by this Court; and if so, (a) how that standard should properly be articulated or characterized, and (b) whether plaintiffs have met their burden under such standard.
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> (2) Whether the damages model presented by plaintiffs' expert generates "false positives" of injury to legacy shippers; and if so, whether this defect affects the validity of the model and thereby precludes certification of the class.
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> (3) Whether [Comcast] and the D.C. Circuit's remand decision reflect a rejection of Fifth and Seventh Circuit precedents holding that "[c]lass certification is not precluded simply because a class may include persons who have not been injured by the defendants' conduct," Mims v. Stewart Title Guar. Co., 590 F.3d 298, 308 (5th Cir. 2009) (citing Kohen v. Pac. Inv. Mgmt. Co., 571 F.3d 672, 677 (7th Cir. 2009)); and if so, the implications of such rejection in this case.
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> (4) Whether [Comcast] announced a new rule regarding the acceptability of individualized damages determinations under Rule 23(b)(3) of the Federal Rules of Civil Procedure; and if so, the implications of such a rule in this case.

Id. at 2-3. In the parties' joint statement of proposed topics for class certification opening arguments, the parties added additional topics for discussion that they had also addressed in their

supplemental briefs. See The Parties' Joint Statement of Proposed Topics for Class Certification Hearing Opening Arguments (Sept. 15, 2014) at 1-2 [Dkt. 727]. After the parties submitted supplemental briefing, the Supreme Court granted certiorari in another class action case, Tyson Foods, Inc. v. Bouaphakeo, and this Court postponed the class certification hearing pending the Supreme Court's decision in that case. Order (Sept. 28, 2015) at 1. The parties subsequently submitted supplemental briefing regarding the impact on this case, if any, of the Supreme Court's decision in Tyson Foods.

In their supplemental brief on remand, plaintiffs suggested that the "core question" on remand is "whether Dr. Rausser's model in fact shows damages for shipments that could not have been affected by the conspiracy." Pls. Supp. Mem. at 2. This is incorrect. The D.C. Circuit's mandate was not limited only to questions regarding legacy shippers — although that was a main focus of its concern. See Order (Oct. 16, 2013) at 2-3. Because the D.C. Circuit vacated this Court's decision in its entirety, the Court has considered all of the arguments presented by the parties, and again addresses all of the issues bearing on class certification under Rule 23.

D. Supplemental Expert Reports

In addition to supplemental briefing on legal issues, the parties have submitted supplemental expert reports in this case for two reasons. First, as the class certification decision was pending before the D.C. Circuit, the parties continued with merits discovery. Dr. Rausser has now produced merits reports, and defendants' experts have produced responses. Discovery in the merits portion of this case is now closed.

Second, the parties and this Court discovered only on remand a potential conflict of interest — namely, that for years Dr. Rausser has "consulted with and invested in companies

that buy out class action claims for profit — including a claim or claims in this case — while serving as an expert witness in class action cases around the country." In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d 94, 95-96 (D.D.C. 2014). This development created serious questions about Dr. Rausser's credibility as an expert in this case. The Court considered whether there was good cause to allow plaintiffs to reopen discovery for the purpose of adding supplemental experts. Id. at 98. Defendants objected, but never moved to strike or exclude Dr. Rausser as an expert witness. See id. at 95-96, 100. After briefing and oral argument, the Court determined that plaintiffs had established good cause to supplement the expert testimony of Dr. Rausser because (1) "the plaintiff class would suffer significant prejudice without the report and testimony of a supplemental expert," (2) "there [was] no evidence in the record that plaintiffs or their counsel had knowledge of the information affecting Dr. Rausser's credibility," and (3) "granting the motion [would] not be unduly burdensome or prejudicial to defendants." Id. at 99. The Court therefore permitted plaintiffs to file supplemental expert reports from Dr. Jeffrey J. Leitzinger and Dr. James T. McClave; defendants filed supplemental reports by Dr. Joseph P. Kalt and Dr. Dennis W. Carlton. At the class certification hearing on September 26-30, 2016, the Court heard testimony from all five experts — including Dr. Rausser — and arguments of counsel regarding the integrity of Dr. Rausser's work, his reliability, and his credibility. These issues will be addressed in Part Two of this Opinion regarding the admissibility of the expert testimony of each of the five proffered experts under Daubert and Rule 702.

PART TWO: ADMISSIBILITY OF EXPERT TESTIMONY UNDER DAUBERT

I. INTRODUCTION

While the interlocutory appeal was pending before the court of appeals and prior to the remand, plaintiffs moved to exclude the opinions of defense expert Dr. Joseph P. Kalt. See In re Rail Freight Fuel Surcharge Antitrust Litig., No. 07-0489, 2016 WL 2962186, at *1 (D.D.C. May 20, 2016). Defendants opposed the motion, arguing that "the proper forum for considering the reliability of Dr. Kalt's methodology and the validity of his opinions [was] at the class certification hearing itself." Id. The Court denied plaintiffs' motion, concluding that it was not required to hold a Daubert hearing before and separate from the class certification hearing. Id. at *2-3. The Court recognized, however, that "the Daubert and Rule 23 standards are different," id. at *2, and that "a district court must 'conduct a Daubert inquiry before assessing whether the requirements of Rule 23 have been met.'" Id. (quoting In re Blood Reagents Antitrust Litig., 783 F.3d 183, 188 (3d Cir. 2015)); see also Messner v. Northshore Univ. HealthSystem, 669 F.3d 802, 812 (7th Cir. 2012). The Court therefore "will first address the relevance of all expert opinions and the reliability of the experts' methodology under Daubert and Rule 702, and then [separately] conduct the 'rigorous analysis' of all of the relevant evidence . . . that is critical to proving the class certification requirements under Rules 23(a) and 23(b) of the Federal Rules of Civil Procedure." In re Rail Freight Fuel Surcharge Antitrust Litig., 2016 WL 2962186, at *2.

II. EXPERT TESTIMONY AT CLASS CERTIFICATION

A. Rule 702 of the Federal Rules of Evidence

"Rule 702 of the Federal Rules of Evidence effectively codifies the Supreme Court's decisions in Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579 (1993), and Kumho Tire

Co. v. Carmichael, 526 U.S. 137 (1999)." FTC v. Whole Foods Mkt., Inc., No. 07-1021, 2007 WL 7632283, at *1 (D.D.C. July 27, 2007). Rule 702 provides that if the Court finds that "scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue," and if the Court finds that the witness "is qualified as an expert by knowledge, skill, experience, training, or education," then the Court may permit the witness to testify — so long as the witness's "testimony is based on sufficient facts or data," "the testimony is the product of reliable principles and methods," and the witness has "reliably applied the principles and methods to the facts of the case." FED. R. EVID. 702. The party seeking to introduce the expert testimony must demonstrate its admissibility under Rule 702 by a preponderance of the evidence. See Meister v. Med. Eng'r Corp., 267 F.3d 1123, 1127 n.9 (D.C. Cir. 2001) (citing Daubert v. Merrell Dow Pharm., Inc., 509 U.S. at 592 n.10); Rothe Dev., Inc. v. Dep't of Defense, 107 F. Supp. 3d 183, 197 (D.D.C. 2015) (citation omitted).

"[T]he twin requirements for the admissibility of expert testimony are evidentiary reliability and relevance." FTC v. Whole Foods Mkt., Inc., 2007 WL 7632283, at *1. "With respect to evidentiary reliability, the Court's focus must be on the methodology or reasoning employed by application of the factors in Rule 702 and the non-exhaustive list of factors set forth in Daubert and Kumho." Id. (citing Daubert v. Merrell Dow Pharm., Inc., 509 U.S. at 595). These factors include: "(1) whether the theory or technique can be and has been tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the method's known or potential rate of error; and (4) whether the theory or technique finds general acceptance in the relevant scientific community." Ambrosini v. Labarraque, 101 F.3d 129, 134 (D.C. Cir. 1996) (citing Daubert v. Merrell Dow Pharm., Inc., 509 U.S. at 593-94). The Court is not bound by only these factors when considering reliability. As the D.C. Circuit has noted,

"[t]he test of reliability is 'flexible' and 'the law grants a district court the same broad latitude when it decides how to determine reliability as it enjoys [with] respect to its ultimate reliability determination.'" Gilmore v. Palestinian Interim Self-Gov't Auth., 843 F.3d 958, 972 (D.C. Cir. 2016) (emphasis in original) (quoting Kumho Tire Co. v. Carmichael, 526 U.S. at 142).

"With respect to relevance, the Court must determine whether the proffered testimony is sufficiently tied to the facts of the case and whether it will aid the factfinder in resolving a factual dispute." FTC v. Whole Foods Mkt., Inc., 2007 WL 7632283, at *1 (citing Daubert v. Merrell Dow Pharm., Inc., 509 U.S. at 592-93). This is a consideration of "fit." Ambrosini v. Labarraque, 101 F.3d at 134 (citing Daubert v. Merrell Dow Pharm., Inc., 509 U.S. at 591). "'Fit' is not always obvious, and scientific validity for one purpose is not necessarily scientific validity for other, unrelated purposes." Id. (citing Daubert v. Merrell Dow Pharm., Inc., 509 U.S. at 591).

B. Daubert Test Versus Rule 23(b) Reliability Standard

On remand, the parties have agreed that the Court must determine whether the plaintiffs have produced a reliable means of proving class-wide injury-in-fact sufficient to satisfy the predominance requirement of Rule 23(b)(3) of the Federal Rules of Civil Procedure. See Class Certification Hr'g Tr. (Sept. 26, 2016) at 26 (plaintiffs' opening argument); Defs. Supp. Opp. at 14. Previously, the Court certified the class under Rule 23 because plaintiffs had shown that Dr. Rausser's theory that injury-in-fact was capable of common proof was "plausible" and that his regression models were "workable." Rail Freight III, 287 F.R.D. at 62. After Comcast, this is no longer enough. Rather, under Rule 23(b)(3), the Court must undertake a rigorous analysis and determine whether there is a "reliable means" of proving injury-in-fact and damages

through common evidence. In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252-53.

Both Daubert and Rule 23(b) require the Court to determine whether an expert's opinion is reliable. There is no indication, however, that the two reliability standards are one and the same, see In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d 412, 417 (E.D. Pa. 2015), and the D.C. Circuit has not spoken to the issue. Although circuit courts of appeal have discussed generally how district courts must evaluate expert opinion at class certification, see WILLIAM B. RUBENSTEIN, NEWBERG ON CLASS ACTIONS § 7:24 (5th ed. 2017), only one court has discussed the scope of Daubert's reliability inquiry when courts must also determine reliability under Rule 23(b) or the difference between the two reliability standards. See In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 415-17.

As Judge Gene Pratter noted in In re Processed Egg Products Antitrust Litigation, the line between Daubert and class-wide impact "might prove somewhat illusory." 81 F. Supp. 3d at 416. "[T]he reliability of the means of proving classwide impact frequently factors into the predominance determination in antitrust class actions," while, at the same time "the Daubert analysis requires the Court to determine whether the expert testimony is reliable" — thus presenting "potential complications . . . relating to the scope of the Daubert inquiry" at class certification. Id. at 415-16. Judge Pratter emphasized that "the focus of the two inquiries is subtly different." Id. at 417. "Daubert 'focuses on principles and methodology, not on the conclusions generated by principles and methodology.'" Id. (quoting In re TMI Litig., 193 F.3d 613, 670 (3d Cir. 1999)). At class certification, the Court must "rule upon the conclusions generated by the principles and methodology," id., to the extent that they are relevant to determining whether plaintiffs have satisfied Rule 23(b). Amgen Inc. v. Conn. Ret. Plans & Tr.

Funds, 568 U.S. 455, 468 (2013). Rule 23 also requires "the Court to consider questions beyond the reliability" of expert testimony, such as whether the expert testimony is sufficient to demonstrate "common impact or that there is a reliable means of proving damages on a classwide basis." In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 417.

Before the Court are the expert reports and testimony of five, often dueling, experts. Their key disputes relate to whether plaintiffs have proffered a reliable means of proving class-wide impact and damages with common evidence, with each expert attacking and/or bolstering the methods and conclusions of the others. The Court therefore will begin by examining the qualifications of each expert, the reliability of their methodologies, and the relevance of their opinions under Daubert and Rule 702, before turning to the "rigorous analysis" required under Rule 23. Although there may be some overlap in these inquiries, the Court will not consider any expert opinion in its Rule 23 analysis that does not first satisfy Daubert and Rule 702. See In re Blood Reagents Antitrust Litig., 783 F.3d at 187. The Court recognizes that "opinion testimony should not be uncritically accepted as establishing a Rule 23 requirement merely because the court holds the testimony should not be excluded under Daubert or for any other reason." In re Hydrogen Peroxide Antitrust Litig., 552 F.3d 305, 323 (3d Cir. 2009). A conclusion that an expert's testimony is admissible under Daubert therefore "does not preclude the Court from denying class certification." In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 417.

III. DAUBERT ANALYSIS OF THE EXPERTS IN THIS CASE

A. Dr. Gordon Rausser

Dr. Gordon Rausser is plaintiffs' lead expert. He is the Robert Gordon Sproul Distinguished Professor at the University of California, Berkeley. Rausser Merits Rep. at 1. He

received a B.S. in agriculture and statistics from California State University, Fresno and an M.S. and a Ph.D. in agricultural economics from the University of California, Davis. See Rausser Merits Reply, Ex. A at 3. He has held positions teaching economics and statistics at numerous universities and has published widely in those fields. See id., Ex. A at 3-48. Dr. Rausser has served as the chief economist at the Agency for International Development and as a senior staff economist on the Council of Economic Advisers. See id., Ex. A at 2, 50. In addition to his position at Berkeley, Dr. Rausser is a senior economic consultant, founder, and chairman of the board of directors of OnPoint Analytics. See id., Ex. A at 1, 50. OnPoint Analytics is "an economic and statistical consulting firm that also provides data services." Rausser Merits Rep. at 4.

1. Dr. Rausser's Credibility in Light of his Involvement with Cascade Settlement Services

a. Factual Background Regarding Dr. Rausser and Cascade

Before turning to the Daubert analysis of Dr. Rausser's work and his expert opinion, the Court must discuss events that have called into question Dr. Rausser's credibility as an expert in this case. In October of 2014, only a few days before the scheduled remand class certification hearing, the Court was informed that Dr. Rausser "for years, consulted with and invested in companies that buy out class action claims for profit — including a claim or claims in this case — while serving as an expert witness in class action cases around the country." In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d at 95-96. This information came to light only after the Court had certified the class, relying heavily on Dr. Rausser's expert opinions, and the D.C. Circuit had vacated that decision in light of Comcast and potential flaws in Dr. Rausser's damages model. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL

No. 1869, 725 F.3d at 255. After numerous status conferences and hearing from both sides, the Court permitted plaintiffs to file supplemental expert reports "address[ing] the reliability and integrity of Dr. Rausser's opinions." In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d at 100.[2] Defendants' experts were allowed to submit responses. These events, in part, caused a two-year delay in holding the remand class certification hearing.

Although the Court has outlined some of these events in a previous opinion, it is appropriate to discuss those same facts here given the importance of Dr. Rausser's work to plaintiffs' motion for class certification. "On March 10, 2014, defendants' counsel received an email from an employee of Cascade Settlement Services ('Cascade') named Rod Montgomery." In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d at 96. Cascade "invests in class action lawsuits by buying out the claims of potential class plaintiffs." Id. at 96 n.2. "It also 'provides comprehensive filing services to maximize settlement proceeds for institutional investors and corporations.'" Id. (quoting Cascade Settlement Services, http://www.cascadesettlement.com/ (last visited Sept. 11, 2017)). Mr. Montgomery's e-mail stated in part:

> I fear the company's involvement with Gordon Rausser, majority owner of OnPoint Analytics, could be a serious conflict of interest . . . . Mr. Rausser holds a non-voting percentage ownership in our company, specifically Cascade, LLC. I believe he has a 10% interest in the company. As a result, he stands to gain directly from any purchases of claims made in the Rail case. He has been able to keep the company apprised of all developments in the case given he has "insider" information. His [damages] model [ ] also

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[2] The Court also heard argument regarding whether plaintiffs could substitute Dr. Rausser with an entirely new expert and set aside all prior briefing in this case as opposed to retaining a supplemental expert to review Dr. Rausser's work. See generally Status Conference Tr. (Nov. 13, 2014) [Dkt. 754]. The Court concluded that "starting over would be extremely prejudicial to defendants, particularly given the considerable length and cost of the class certification proceedings to date." In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d at 101.

might have indirect or direct benefit to him financially.

Id. at 96 (alteration in original).[3] Defendants did not immediately share this information with the Court or with plaintiffs' counsel. Id. In a previously scheduled deposition of Dr. Rausser on July 31, 2014, defendants' counsel asked him "whether 'there [is] any formal relationship between OnPoint Analytics and Cascade Settlement Services.'" Id. Dr. Rausser said no, but he added that OnPoint Analytics "has done work for [Cascade] in the past." Id. In response to further questions, he "denied that he or OnPoint had any ownership or other financial interest in Cascade." Id.; see also Defs. Ex. 1, Rausser Dep. (July 31, 2014) at 829.

After Dr. Rausser's July 31, 2014 deposition, plaintiffs produced an errata sheet that qualified his response to one of the questions. In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d at 97. The errata sheet stated that Dr. Rausser did not have an ownership interest in Cascade as a company, but that he did "have the right to share in distributions from certain claims [Cascade] manage[s], but those do not include claims in this case or any other case in which [he is] a testifying expert or OnPoint has performed any services." Id.; see also Defs. Ex. 1, Errata to the Deposition of Gordon C. Rausser at 1-2.

After additional discovery, it appeared that there was a far more substantial relationship between Dr. Rausser, OnPoint Analytics, and Cascade than Dr. Rausser had acknowledged. In July of 2010, "after completion of Dr. Rausser's first class certification report but before the class certification briefing was completed, Dr. Rausser and OnPoint each began negotiations to enter business relationships with Cascade." In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d at 97; see also Status Conference Tr. (Nov. 13, 2014) at 41. This

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[3] Cascade and Dr. Rausser often referred to this case as the "Rail" case or the "Rails" case. See In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d at 96; Class Certification Hr'g Tr. (Sept. 28, 2016) at 534.

Court held the initial class certification hearing on October 6 and 7, 2010. On October 14, 2010, OnPoint Analytics, the consulting firm of which Dr. Rausser is the chairman and founder, entered into "a modeling services agreement" with Cascade. Class Certification Hr'g Tr. (Sept. 27, 2016) at 334-38.

Dr. Rausser himself entered into an agreement with Cascade to provide consulting services on December 16, 2010. Class Certification Hr'g Tr. (Sept. 27, 2016) at 335. Under his consulting agreement, Dr. Rausser was to provide Cascade with "strategic services," "origination services," and "management services." Defs. Ex. 1, Consultation Agreement at 2. These services included, among other things, identifying cases and claims for purchase, modeling cases and claims, and marketing efforts. Class Certification Hr'g Tr. (Sept. 28, 2016) at 526. Dr. Rausser testified that there was an "oral understanding" with Cascade that he could not receive "any economic interest" for cases in which he was a testifying expert. Class Certification Hr'g Tr. (Sept. 27, 2016) at 340. This understanding was not reflected in his consulting agreement with Cascade or in OnPoint's agreement with Cascade. Class Certification Hr'g Tr. (Sept. 28, 2016) at 562; see also Defs. Ex. 1, Modeling Services Agreement.

Dr. Rausser's compensation for these services included "distributions from funds." Class Certification Hr'g Tr. (Sept. 27, 2016) at 336. In 2011, Cascade set up Cascade Settlement Services Fund 1 ("Fund 1"). Id. at 339. It appears that Cascade was also trying to set up a second fund at some point after 2011. Id. In general, these funds include claims from class actions that Cascade has purchased at a lower price in the hope of redeeming claims for a higher value later. See Class Certification Hr'g Tr. (Sept. 28, 2016) at 525. Dr. Rausser's consulting agreement entitled him to 10% of "any Distributions received by Cascade from any Fund during that quarter which is attributable to any Contract entered into during the Term." Defs. Ex. 1,

Consultation Agreement at 3. In addition to his consulting agreement, Dr. Rausser invested approximately $1.3 million in Fund 1 through a subscription agreement and a promissory note. Class Certification Hr'g Tr. (Sept. 28, 2016) at 528-30.

Dr. Rausser testified that he had no knowledge that there was a claim from this case in Fund 1 when his deposition was taken on July 31, 2014. Class Certification Hr'g Tr. (Sept. 27, 2016) at 343. Dr. Rausser apparently learned that there was a claim from this case in Fund 1 after his July 31, 2014 deposition, when defendants asked him about Cascade. Class Certification Hr'g Tr. (Sept. 28, 2016) at 558. He testified that he spoke with officials at Cascade, and they later sent him documentation indicating that the Rail Freight claim had been removed from Fund 1. Id.

Dr. Rausser's possible financial interest in this case, however, is not the only credibility concern. Cascade asked Dr. Rausser and his OnPoint Analytics colleague, Dr. Gareth Macartney, to discuss this case with them. See Class Certification Hr'g Tr. (Sept. 28, 2016) at 535. Dr. Rausser stated that he would answer any questions about this case as a courtesy so long as those questions could be answered from information in the public domain. Id. at 535-36. "[A] handful of times" during the four years that Dr. Rausser worked with Cascade, the company asked questions that could not be answered from information in the public domain, and Dr. Rausser testified that he did not respond to those questions. Class Certification Hr'g Tr. (Sept. 27, 2016) at 338.

Defendants also have asserted that some of the work that OnPoint produced for meetings with Cascade conflicts with Dr. Rausser's expert opinion in this case. See Class Certification Hr'g Tr. (Sept. 30, 2016) at 1174-75. Specifically, they point to a memorandum

from Dr. Macartney to Dr. Rausser, created before a meeting with Cascade, in which Dr. Macartney stated that "Rail Freight claim filing will be complex because":

> (a) [t]he class definition excludes legacy contracts and mileage[] based Fuel Surcharges, but includes NS "re-based" Fuel Surcharges . . . ; (b) Fuel Surcharges depended on the price of oil and were therefore different depending on the timing of the shipment; (c) Fuel Surcharges were different in their underlying indexes (HDF or WTI), thresholds and conversion formulas for different Railroads and different shipper categories (such as Intermodal, Carload and Coal); (d) [t]here were (very rare) instances of exceptional Fuel Surcharges, with slightly non-standard formulas; (e) Interline shipments; [and] (f) [t]he estimate overcharge will vary by time (it was greater when the price of oil was high) and may vary by shipper category (such as Intermodal, Coal etc.), or some other dimension.

Defs. Ex. 1, Memorandum from Dr. Gareth Macartney to Dr. Gordon Rausser (Feb. 1, 2011), at OPA_GR_SUB_00227-28.

Dr. Rausser did not actually receive any compensation from Cascade. He terminated his consulting agreement in 2014 before receiving any payments — apparently after his connection to Cascade came to light in this case. Class Certification Hr'g Tr. (Sept. 27, 2016) at 336, 338-39. There was no indication at the hearing that Dr. Rausser received a distribution from Fund 1. Dr. Rausser unsuccessfully attempted to sell his investment in Fund 1 to other investors, and he then gifted the investment to the University of California "to support a master's degree program in development practice, focusing on students from less developed countries." Id. at 344. Dr. Rausser testified that he saw no problem with his arrangement with Cascade, but "looking back in time, and given the appearances of some potential lack of objectivity or some potential conflict of interest, it's clear that [he] did not exercise sound judgment." Id. at 338.

b. Court's Conclusions Regarding Dr. Rausser's Credibility in the Daubert Context

Defendants have not moved to exclude or disqualify Dr. Rausser. Nor did the parties submit briefing specifically addressing the question whether it was appropriate for the Court to consider Dr. Rausser's credibility in its Rule 702 analysis. Dr. Rausser's affiliation with Cascade and his investments in Fund 1, however, were discussed at length at the remand class certification hearing. The Court has found no precedent — and counsel for the parties have provided none — directly addressing issues similar to those presented by Dr. Rausser's involvement with Cascade.[4]

As this Court has stated, Dr. Rausser's "credibility has been drawn into serious question" after the discovery of his consulting arrangement and investments with Cascade. In re Rail Freight Fuel Surcharge Antitrust Litig., 75 F. Supp. 3d at 96. Typically, any attempt by the Court to evaluate the "credibility of opposing experts and persuasiveness of competing scientific studies" conflates "the questions of the admissibility of expert testimony and the weight appropriately to be accorded such testimony by a fact finder." Ambrosini v. Labarraque, 101 F.3d at 141; cf. Elcock v. Kmart Corp., 233 F.3d 734, 751 (3d Cir. 2000). The Court sees two principal issues with respect to Dr. Rausser's credibility: (1) the potential conflict of interest based on his financial interest in Fund 1 and (2) the possibility that Dr. Rausser or his colleague, Dr. Macartney, provided Cascade with information that potentially is inconsistent with the opinions or conclusions Dr. Rausser has provided in support of plaintiffs' motion for class certification in this case. Given the unique circumstances presented by Dr. Rausser's

[4] Dr. Rausser is also the direct purchaser plaintiffs' expert in In re Processed Egg Products Antitrust Litigation. 81 F. Supp. 3d 412. Judge Pratter briefly discussed Dr. Rausser's credibility in her opinion denying the defendants' motion to exclude Dr. Rausser in that case. Id. at 417-18.

involvement with Cascade, the Court has carefully considered whether it is necessary to exclude Dr. Rausser's expert opinion and concludes that it is not.

With respect to whether Dr. Rausser's potential financial interest in Cascade Fund I created a conflict of interest under Rule 702, there is very little relevant case law. The most analogous situation is where an expert testifies on the basis of a contingency fee. Numerous courts have concluded that this practice is unethical, and some courts have found it a proper basis to exclude or disqualify an expert because the expert has a direct financial interest in the outcome of the litigation. See, e.g., Straughter v. Raymond, No. 08-2170, 2011 WL 1789987, at *2 (C.D. Cal. May 9, 2011) (collecting cases). But see Tagatz v. Marquette Univ., 861 F.2d 1040, 1042 (7th Cir. 1988) (noting that an expert's potential conflict of interest, such as a contingency fee arrangement, is a credibility determination for the fact-finder). In addition, at least one court has excluded testimony from an expert witness who was the only shareholder of the plaintiff company and therefore had "the only direct financial stake in the outcome of [the] litigation." See Perfect 10, Inc. v. Giganews, Inc., No. 11-7098, 2014 WL 10894452, at *5 (C.D. Cal. Oct. 31, 2014) (emphasis in original). In Perfect 10, Inc. v. Giganews, Inc., the court noted that district courts "reserve the power to disqualify an expert for rare or extreme cases," but courts may exercise that power "to achieve 'important policy objectives . . . includ[ing] preventing conflicts of interest and maintaining the integrity of the judicial process.'" Id. at *4 (quoting English Feedlot, Inc. v. Norden Labs., Inc., 833 F. Supp. 1498, 1504 (D. Colo. 1993)).

The Court concludes that it should not exclude Dr. Rausser under Rule 702 on the basis of his potential financial interest in this case. Dr. Rausser's alleged financial interest here is not similar to an expert testifying on the basis of a contingency fee. And, unlike the expert in Perfect 10, Inc. v. Giganews, Inc., Dr. Rausser is neither the sole investor in Fund 1 nor the sole

shareholder of Cascade. See 2014 WL 10894452, at *5. It also is not apparent to the Court that Dr. Rausser submitted his expert reports knowing that he had or potentially had a direct financial interest in the outcome of this litigation. At the outset of his negotiations with Cascade, Dr. Rausser was aware that Cascade sought to buy claims in this case, Class Certification Hr'g Tr. (Sept. 28, 2016) at 533-34, and he identified claims from this case for Cascade's investment portfolio. See Defs. Ex. 1, E-mail from Dr. Gordon Rausser, to John Chilcott (May 21, 2013, 6:02 PM), at OPA_GR_SUB_00880. Dr. Rausser testified, however, that he had no knowledge that a claim from this case was in Fund 1 — the only Cascade fund in which he had invested — prior to submitting his six expert reports in this case. Class Certification Hr'g Tr. (Sept. 28, 2016) at 558. When he called Cascade to check after his deposition in July of 2014, only then did he discover that a claim from this case was in Fund 1. Id. From these facts alone, the Court is not convinced that Dr. Rausser should be excluded under Rule 702.

The Court next turns to the issue that Dr. Rausser — or his colleague, Dr. Macartney — possibly disclosed information to Cascade or gave it advice that is inconsistent with his expert opinion. The Third Circuit has noted specific instances where it may be appropriate for a district court to consider an expert's credibility at the Rule 702 stage. In Elcock v. Kmart Corp., the Third Circuit stated:

> [C]onsider a case in which an expert witness, during a Daubert hearing, claims to have looked at the key data that informed his proffered methodology, while the opponent offers testimony suggesting that the expert had not in fact conducted such an examination. Under such a scenario, a district court would necessarily have to address and resolve the credibility issue raised by the conflicting testimony in order to arrive at a conclusion regarding the reliability of the methodology at issue. We therefore recognize that, under certain circumstances, a district court, in order to discharge its fact-finding responsibility under Rule 104(a), may need to evaluate an expert's general credibility as part of the Rule 702 reliability inquiry. . . . [T]he fact that an expert witness

> falsely reported his salary on an income tax return [by contrast] has little if any bearing on the reliability of a diagnostic test he frequently employs, but the fact that the expert lied about whether his methodology had been subjected to peer review, or intentionally understated the test's known rates of error, is a different matter entirely.

233 F.3d at 751 n.8.

Defendants have asserted that Dr. Rausser and his OnPoint Analytics associate, Dr. Macartney, provided Cascade with information about the potential damages claims in this case that is inconsistent with the damages calculations he has offered in his reports. See Class Certification Hr'g Tr. (Sept. 30, 2016) at 1174-75. Defendants assert that Dr. Rausser's damages model provides for a weekly average overcharge for every shipper, regardless of their differences, even though he told Cascade that "the claims filing process in [this] case was going to be complex . . . [and] the estimated overcharge will vary by time and may vary by shipper category." Id. at 1175. Under the Third Circuit's approach, this evidence goes to the weight to be given to Dr. Rausser's expert opinion, not to its admissibility under Rule 702. See Elcock v. Kmart Corp., 233 F.3d at 751 n.8. There is no allegation that Dr. Rausser lied about his methodologies or his work product in such a way that the Court would need to exclude Dr. Rausser's opinion for lack of reliability under Rule 702.

Dr. Rausser testified that he did not "exercise sound judgment" in his involvement with Cascade. Class Certification Hr'g Tr. (Sept. 27, 2016) at 338. Despite his testimony that he saw no problem with his arrangement with Cascade, see id., Dr. Rausser was keenly aware that his consulting arrangement could appear to be a conflict of interest. In an e-mail to John Chilcott, a co-founder of Cascade, Dr. Rausser stated that Cascade's marketing department needed to stop using his name and likeness in "marketing materials for use in the Rail Freight case . . . so as to avoid any conflict with [his] role as an expert witness." Defs. Ex. 1, E-mail

from Dr. Gordon Rausser, to John Chilcott (May 21, 2013, 6:02 PM), at OPA_GR_SUB_00881. The Court agrees that, at the very least, Dr. Rausser did not exercise sound judgment. Dr. Rausser has cost both parties considerable time and money in litigating this case and has put his professional reputation at risk.

While Dr. Rausser's involvement with Cascade raises serious concerns regarding his credibility as an expert in this case, the Court will not exclude him or his expert opinions on this basis under Daubert and Rule 702. The Court heard extensive testimony and oral argument regarding the reliability of Dr. Rausser's work in support of class certification and will consider those arguments as it proceeds to evaluate the reliability of Dr. Rausser's methods and opinions under Daubert and Rule 702.

2. Rule 702 Analysis of Dr. Rausser's Expert Opinion

a. Introduction

The Court has "broad discretion in determining whether to admit or exclude expert testimony." U.S. ex rel. Miller v. Bill Harbert Int'l Constr., Inc., 608 F.3d 871, 895 (D.C. Cir. 2010) (quoting United States v. Gatling, 96 F.3d 1511, 1523 (D.C. Cir. 1996)). While defendants have not moved to exclude any of the plaintiffs' experts under Daubert and Rule 702 — including Dr. Rausser — the Court has recognized that district courts must first "conduct a Daubert inquiry before assessing whether the requirements of Rule 23 have been met." In re Blood Reagents Antitrust Litig., 783 F.3d at 188; see supra at 17. The Court therefore addresses the admissibility of Dr. Rausser's expert opinion even though defendants have not raised any specific Daubert challenges to his work.

In addition to the twin requirements that expert testimony must be reliable and relevant, FTC v. Whole Foods Mkt., Inc., 2007 WL 7632283, at *1, an expert witness also must

be "qualified" under Rule 702. An expert may be qualified by "knowledge, skill, experience, training, or education." FED. R. EVID. 702. The parties stipulated to Dr. Rausser's expertise as an expert in economics and econometrics. Class Certification Hr'g Tr. (Sept. 27, 2016) at 330. Based on Dr. Rausser's education and experience, the Court finds that he is qualified as an expert in economics and econometrics.

While the D.C. Circuit was considering the interlocutory appeal of this Court's decision to certify the class, the parties continued with discovery in this case. In addition to his initial class certification expert reports, Dr. Rausser has submitted merits reports and supplemental reports, primarily addressing the D.C. Circuit's concern about whether his damages model produces false positives. Dr. Rausser by now has submitted six expert reports in this case: (1) Corrected Expert Report of Gordon Rausser (May 27, 2010); (2) Corrected Expert Reply Report of Gordon Rausser (Sept. 20, 2010); (3) Expert Report of Gordon Rausser (Oct. 15, 2012); (4) Expert Reply Report of Gordon Rausser (June 12, 2013); (5) Supplemental Expert Report of Gordon Rausser (Dec. 19, 2013); and (6) Supplemental Reply Expert Report of Gordon Rausser (May 28, 2014).

Dr. Rausser's expert opinions can be grouped into five categories: (1) an economic analysis of the rail freight industry and defendants' conduct; (2) an analysis of defendants' transaction data as evidence of common impact; (3) a common factors analysis, (4) a damages model; and (5) a post-remand "legacy decomposition," which is an in-depth analysis of the legacy shipments identified by defendants. The Court will address each aspect of Dr. Rausser's expert opinion and determine its admissibility under Rule 702.

b. Qualitative Economic Analysis

Dr. Rausser begins his expert opinion with an analysis of the documentary evidence in this case. See generally Rausser Merits Rep. at 11-112. At the class certification hearing, Dr. Rausser characterized the first question he examined as whether "there [is] factual support from the discovery record for an agreement [to collude]." Class Certification Hr'g Tr. (Sept. 27, 2016) at 346. Under Rule 704 of the Federal Rules of Evidence, the Court may not exclude evidence "just because it embraces an ultimate issue" in the case. FED. R. EVID. 704(a). But in an antitrust case, an expert may not opine as to whether there was a conspiracy or an agreement to engage in price fixing; that is a question for the fact-finder. See In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 421; In re Urethane Antitrust Litig, No. 04-1616, 2012 WL 6681783, at *3 (D. Kan. Dec. 21, 2012). An expert may opine as to whether particular conduct, "assuming [it] occurred, [is] consistent with a conspiracy," but an expert "may not give any opinion concerning . . . whether a particular event actually occurred." In re Urethane Antitrust Litig., 2012 WL 6681783, at *3. In certain portions of his expert reports and testimony, Dr. Rausser comes too close to offering opinions that certain events in fact occurred for the Court to admit these statements.

At the class certification hearing, Dr. Rausser attempted to testify that defendants "agreed to" (1) "[c]reate aggressive new formulas and apply FSCs as broadly as possible"; (2) create "[p]olicies to ensure their common goal of achieving 100% FSC coverage"; (3) create "[p]olicies against negotiating, discounting, waiving, or offsetting FSCs"; and (4) "[e]ffectuate an across-the-board rate increase." Pls. Ex. 1 at 3; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 348-50. Dr. Rausser testified that this opinion was based on a number of documents in

the record that he reviewed. Class Certification Hr'g Tr. (Sept. 27, 2016) at 349-50.[5] Because this portion of Dr. Rausser's expert testimony seeks to establish that there was in fact an agreement to collude based only on facts in the documentary record, the Court will exclude this portion of his testimony. The Court will also exclude those statements in Dr. Rausser's expert reports in which he opines that defendants intended or agreed to collude and that such actions were pretextual. See, e.g., Rausser Merits Reply at 31, 91, 94; Rausser Supp. Reply at 5.

As part of his economic analysis in part IV of his Merits Report, Dr. Rausser explains characteristics of the U.S. rail freight industry that make the industry conducive to price fixing. See Rausser Merits Rep. at 11-51. According to Dr. Rausser, these factors are that (1) the alleged cartel members have market power; (2) "there is little threat of entry by non-cartel competitors"; (3) the "product or service is homogenous and interchangeable"; (4) the demand for the product or service "is relatively inelastic"; and (5) "the pricing of the product or service is well understood and easily communicated among industry participants." Id. at 11. Dr. Rausser opines that "[a]ll of these factors are present in the rail freight industry in which the Defendants operate." Id.

More specifically, Dr. Rausser notes in Part IV that the four defendant railroads "are responsible for the vast majority of shipments in every sizeable state" in the United States. Rausser Merits Rep. at 12. The four defendants "account for over 90% of the track miles" in the

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[5] At the class certification hearing, defendants objected to this line of testimony because, they assert, Dr. Rausser's testimony is based on interline-related communications between the defendant railroads and therefore are protected by statute. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 350; see generally 49 U.S.C. § 10706. The Court has not yet decided whether the communications in these documents are in fact protected under Section 10706. See Rail Freight III, 287 F.R.D. at 19-20. The Court need not reach this issue now because it can resolve the issue of whether to certify the class without relying on any of these documents. The Court therefore will not rule on defendants' motion to exclude interline-related communications [Dkt. 417] at this time.

continental United States and about "94% of all rail freight revenue" in the continental United States. Id. at 26; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 348. Because railroads incur high fixed costs to create and maintain railroad infrastructure, the current railroads have a competitive advantage, and there are "significant barriers to entry" for potential competitors. Rausser Merits Rep. at 32. Dr. Rausser states that "[a] price-fixing conspiracy is most effective in situations where demand for the conspirators' goods or service is sufficiently inelastic so that they can sustain artificially high prices without enough customers turning away so as to make the price increase unprofitable." Id. at 36.[6] According to Dr. Rausser, "an analysis of the industry reveals that the Defendants' businesses are concentrated in commodities and distances over which rail is the most cost-efficient transport option and therefore the demand that they faced was in general inelastic." Id. at 38-39; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 348. Lastly, Dr. Rausser explains that freight railroad companies "use common types of price authority documents" — such as contracts, private price quotes, and tariffs — which allow defendants to monitor each other's pricing behavior, "notwithstanding the extent of private contracting." Rausser Merits Rep. at 45-46; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 348.

This portion of Part IV of Dr. Rausser's Merits Report is admissible. An expert is permitted to testify "as to whether an industry's market structure makes it particularly susceptible to collusion." In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 421; see

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[6] "Elasticity" measures the sensitivity of one variable to change in a second variable, and it is expressed as a ratio between the percent change in the first variable and the percent change in the second variable. See Leitzinger Rep. ¶ 109; Carlton Rep. ¶ 6 n.7. As used here, the term "inelastic" refers to a common application known as "elasticity of demand," which describes the relationship between the price of a good and the quantity of the good demanded as "the percentage change in quantity demanded in response to a change in price." Rausser Merits Rep. at 24 n.25 (citing RICHARD A. POSNER, ANTITRUST LAW 11-12 (2d ed. 2001)).

also In re Urethane Antitrust Litig., 2012 WL 6681783, at *3. Dr. Rausser has reviewed defendants' market share, geographic scope, and services offered to determine that the U.S. rail freight industry is susceptible to price fixing. See Rausser Merits Rep. at 11-49. This opinion certainly is within the scope of Dr. Rausser's expertise as an economist, see In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 423, and there is no indication that Dr. Rausser's analytical methods are unreliable or based on insufficient data. The Court concludes that his opinions and discussion of these matters would "help the trier of fact to understand the evidence or to determine a fact in issue" and therefore are admissible. FED. R. EVID. 702(a).

Part V of Dr. Rausser's Merits Report is a closer call. In Part V of his economic analysis, Dr. Rausser explains that — after a review of the documentary evidence — he concludes that defendants' class period behavior "is consistent with" a price-fixing conspiracy and is "evidence of collusion." See Rausser Merits Rep. at 52-112. The former characterization is admissible expert opinion; the latter is not. To summarize his relevant opinion, Dr. Rausser states that defendants' behavior was "starkly different" during the class period, when compared to the pre-class period. Id. at 53. According to Dr. Rausser, a review of the documentary evidence shows that before the class period, defendants "act[ed] in a unilateral fashion and without [the] benefit of coordination, [and] faced difficulties in forcing shippers to accept their original fuel surcharges due to competitive circumstances." Id. at 55. He states that during the pre-class period fuel surcharges "were not applied consistently to all contracts and were often modified or waived in favor of base rate increases." Id. at 56. But during the class period, he says, defendants "coordinate[d] the development and implementation of their Fuel Surcharge programs," id. at 58; see also id. at 58-70, and they adopted policies against negotiating with

shippers and sought universal coverage to increase application of fuel surcharges. Id. at 67, 70-72.

As previously noted, economic experts may testify as to "whether certain conduct is indicative of collusion," In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 420, or "consistent" with a conspiracy. In re Urethane Antitrust Litig., 2012 WL 6681783, at *3. Such testimony necessarily involves consideration of the defendants' conduct in the case. For example, Dr. Rausser states that "[t]he Fuel Surcharge program furthered the cartel's collusive interest, but was inconsistent with Defendants pursuing their independent, unilateral self-interest." Rausser Merits Rep. at 99. "This is precisely the type of inquiry an economist can be expected to make using his expertise." In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 424. In addition, it can be helpful "for an expert to put events into an economic context." In re Urethane Antitrust Litig., 2012 WL 6681783, at *3. To the extent that Dr. Rausser, after reviewing the documentary record, opines as to whether defendants' behavior is consistent with collusion, this is permissible expert opinion. To the extent that he concludes that there was in fact collusion, it is not. The Court concludes that most, but not all, of Part V of Dr. Rausser's qualitative economic analysis is within the scope of his expertise as an economist and is relevant under Rule 702 to "help the trier of fact to understand the evidence or to determine a fact in issue." FED. R. EVID. 702(a); see also FTC v. Whole Foods Mkt., Inc., 2007 WL 7632283, at *1.[7]

[7] There are a number of statements in Part V of Dr. Rausser's Merits Report that are impermissible statements about what conduct in fact occurred or which touch upon the ultimate issue of whether there was collusion. Because the Court is the fact-finder at the class certification stage, it need not excise or strike specific portions of Dr. Rausser's report or statements contained within in it. See In re Rail Freight Fuel Surcharge Antitrust Litig., 2016 WL 2962186, at *1-2 (quoting In re Salem, 465 F.3d 767, 777 (7th Cir. 2006)). It can separate the admissible from the inadmissible in deciding whether to certify the proposed class.

c. Documentary Record and Defendants' Transaction Data as Evidence of Class-wide Impact

Dr. Rausser asserts that defendants' transaction data indicate that defendants implemented the alleged "Fuel Surcharge strategy across the board and that the prices paid by Class Members increased as a result." Rausser Merits Rep. at 113. According to Dr. Rausser, the transaction data demonstrate that defendants' fuel surcharge formulas were "highly similar." Id. at 114; see id. at 114-27. Based upon a review of the documentary evidence, he also states that defendants' policies assured class-wide impact because: (1) defendants intended to achieve universal fuel surcharge coverage, (2) there was a common policy of not discounting base rates, and (3) defendants' policies provided them with a pretext of fuel cost recovery. See id. at 127-29. Dr. Rausser then states that the transaction data confirm these conclusions. Id. at 129-44.

This portion of Dr. Rausser's opinion also required a review of the documentary record. It is a "sound economic practice to review the factual record and formulate a hypothesis that can be tested using economic theory," so "examination of the factual record is necessary to determine which tests to run and to confirm that the stories drawn from the data and from the factual record are consistent." In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 424. The Court will admit the subsections of Dr. Rausser's analysis that illustrate whether the transactional data demonstrate, for example, widespread application of fuel surcharges or a lack of discounting to shippers. This expert opinion is relevant to the issues to be decided at class certification and is within the scope of Dr. Rausser's expertise.

The Court need not, however, admit bald conclusions based on the documentary record regarding defendants' intent or whether the fuel surcharge programs were pretextual. Dr. Rausser includes these statements in some of his discussion of the documentary record and

the defendants' transaction data. See, e.g., Rausser Class Rep. at 102-03, 111; Rausser Merits Rep. at 127, 129, 145. "[T]he cases are clear that an economist's testimony is not admissible where he or she simply reads and interprets evidence of collusion as any juror might, or where an economist infers intent to collude from mere documentary evidence, unrelated to his or her economic expertise." In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 421; see City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 565 (8th Cir. 1998). Such opinion is beyond the scope of Dr. Rausser's expertise as an economist, and the Court will exclude it as unreliable. See Goodman v. Harris County, 571 F.3d 388, 399 (5th Cir. 2009); Dome Patent, L.P. v. Rea, 59 F. Supp. 3d 52, 85 (D.D.C. 2014). The Court will conduct its own review of the documentary record in this case as it relates to common impact. See infra at 130-38.

In his common impact analysis, Dr. Rausser also explains how economic principles suggest that "captive shippers" — "shippers in remote regions served by only one railroad" — were also injured in the conspiracy. Rausser Merits Rep. at 144. Dr. Rausser offers this opinion to rebut defendants' argument that captive shippers could not suffer antitrust injury. See Class Certification Hr'g Tr. (Oct. 7, 2010) at 172. He provides transaction data from one captive shipper, Nevada Power, to support his conclusion. Id. at 146-47. This opinion is within the scope of Dr. Rausser's economic expertise and relevant to the issues to be decided. Whether transaction data from only one captive shipper is worth much goes to its probative value, not its admissibility under Daubert.

d. Common Factors Model

Dr. Rausser's common factors model is one piece of quantitative evidence that plaintiffs offer to prove common impact, Class Certification Hr'g Tr. (Sept. 27, 2016) at 321, and is a necessary step in determining whether a regression model can quantify class-wide damages.

See Rausser Merits Rep. at 10-11. As the Court noted in its previous opinion, Dr. Rausser states that the common factors model and the damages model "together reveal that impact can be established at trial with evidence common to the class." Rail Freight III, 287 F.R.D. at 25; see also Rausser Class Reply at 91-92, 99-100. This is also true on remand.

The common factors model is a regression analysis that examines "whether the Defendants' rail freight prices are based on factors that are common to all shipments . . . as opposed to factors specific to particular shippers." Rausser Merits Rep. at 113; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 366. "A regression is a statistical tool designed to express the relationship between one [dependent] variable, such as price, and [independent] variables that may affect the first variable." In re High-Tech Emp. Antitrust Litig., No. 11-2509, 2014 WL 1351040, at *5 n.7 (N.D. Cal. Apr. 4, 2014) (quoting In re Aftermarket Auto. Lighting Prods. Antitrust Litig., 276 F.R.D. 364, 371 (C.D. Cal. 2011)). Regression analysis is a commonly accepted statistical tool, see id. at *14, and is useful "(1) in determining whether a particular effect is present; (2) in measuring the magnitude of a particular effect; and (3) in forecasting what a particular effect would be, but for an intervening event." Daniel L. Rubinfeld, Reference Guide on Multiple Regression, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 303, 306 (3d ed. 2011) ("Rubinfeld").

Through his common factors analysis, Dr. Rausser identified seven factors, or variables, that explain the variation in rail freight pricing. See Rausser Merits Rep. at 113, 159. These factors are: (1) weight of cargo, (2) distance traveled, (3) interline or non-interline, (4) route taken, (5) commodity type, (6) car type, and (7) timing/seasonality. See Pls. Ex. 1 at 8; Rausser Merits Rep., Table 52. In Dr. Rausser's analysis, each common factor had to have a "statistically significant effect on price, i.e., not one that is just due to random variation in the

data." Rausser Merits Rep. at 160. Dr. Rausser determined that these seven "common factors predominate in Defendants' pricing of rail freight and that, once they are accounted for, a very high proportion of the variation in freight prices can be explained." Id. at 113; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 366. According to Dr. Rausser, these seven factors explain 75% of the variation in rail freight prices, which is "a high explanatory power." Class Certification Hr'g Tr. (Sept. 27, 2016) at 366; see also Rausser Merits Rep. at 159-60. Dr. Rausser states that "[i]t is rarely, if ever, possible to explain 100% of the variation in prices in any market — there is always some random variation that remains, especially for large data sets." Rausser Merits Rep. at 160. Dr. Rausser concludes that his common factors analysis "confirms that it is possible for a regression model to control for the factors that determine freight rates in assessing what portion of the higher prices observed in the Class Period are attributable to the alleged conspiracy." Id. at 113.

Dr. Kalt asserts that Dr. Rausser's common factors model does not establish common impact. Class Certification Hr'g Tr. (Sept. 29, 2016) at 867. As defendants explain, the common factors model does not show that "those common factors affect the class members' rates in the same and predictable way." Class Certification Hr'g Tr. (Sept. 30, 2016) at 1182. For example, a shipment's route — whether a long or short distance — drastically affects the price paid by a shipper, and so "route" is a differentiating factor rather than a common factor. Class Certification Hr'g Tr. (Sept. 27, 2016) at 239-41; see also Kalt Class Rep. ¶¶ 130-31. Contrary to Dr. Kalt's assertion, however, plaintiffs do not offer Dr. Rausser's common factors model alone as proof of common impact. Plaintiffs argue that the common factors model and the damages model together establish that there is class-wide evidence of impact capable of proof at trial. See Rail Freight III, 287 F.R.D. at 25; Rausser Class Reply at 91-92, 99-100. The purpose

of the common factors model is to establish whether there are common factors that explain the variation in rail freight pricing, and if Dr. Rausser can control for those factors when determining whether overcharges are attributable to the alleged conspiracy. Rausser Merits Rep. at 160. The Court finds that Dr. Rausser's common factors model is reliable under Daubert and Rule 702 for the purpose for which it is offered — to determine the principal factors that explain the variation in rail freight pricing.

Defendants also argue that Dr. Rausser's common factors model omits key variables such as the earning power of a particular fuel surcharge, any information about individual shippers, or whether the shipper had previously paid a fuel surcharge. See Class Certification Hr'g Tr. (Sept. 26, 2016) at 173-74. Defendants' expert, Dr. Kalt, testified that because there is no variable related to fuel surcharges in the common factors model, there is no explanation in the model of how a fuel surcharge affected a shipper's rate. See Class Certification Hr'g Tr. (Sept. 29, 2016) at 869. In general, "an expert's 'failure to include variables will affect the analysis' probativeness, not its admissibility.'" In re Wireless Tel. Servs. Antitrust Litig., 385 F. Supp. 2d 403, 427 (S.D.N.Y. 2005) (quoting Bickerstaff v. Vassar Coll., 196 F.3d 435, 449 (2d Cir. 1999)); see also Bazemore v. Friday, 478 U.S. 385, 400 (1986) (same). But a common factors model can be "so incomplete as to be inadmissible as irrelevant." In re Wireless Tel. Servs. Antitrust Litig., 385 F. Supp. 2d at 427 (quoting Bickerstaff v. Vassar Coll., 196 F.3d at 449); cf. In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 430 (noting that a court "must determine whether [any] absent factors in [the] common factors analysis are so important as to render [the] analysis unreliable"). In the Court's view, Dr. Rausser has not omitted so many variables from his model as to render it either irrelevant or unreliable — and ultimately inadmissible — under Rule 702. See In re Processed Egg Prods.

Antitrust Litig., 81 F. Supp. 3d at 430. Dr. Rausser's common factors model is run on sufficiently robust, reliable data, and it is relevant to the question of whether there is proof of common impact. The Court therefore concludes that Dr. Rausser's common factors model is admissible under Rule 702. Defendants' arguments go to the weight to be given to Dr. Rausser's expert opinion at class certification, not its reliability under Daubert and Rule 702.

e. Damages Model

"Damages calculations in antitrust cases seek to compare plaintiffs' actual experience in the real world with what the plaintiffs' experience would have been, 'but for' the antitrust violation." In re Pool Prods. Distribution Mkt. Antitrust Litig., 166 F. Supp. 3d 654, 678 (E.D. La. 2016) (citing ABA SECTION OF ANTITRUST LAW, ANTITRUST LAW DEVELOPMENTS 783 (7th ed. 2012)). Plaintiffs offer Dr. Rausser's damages model as evidence that both class-wide impact and damages are susceptible to common proof. See, e.g., Rausser Merits Rep. at 170. Because Dr. Rausser has updated his damages model during the course of this litigation, the Court will refer to his most recent damages model, which incorporates additional data from the STB. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 370. The parties refer to this version of the damages model as Dr. Rausser's "STB model." See id. at 311, 402.

Dr. Rausser's damages model is a log-log, reduced form pricing regression that builds upon the common factors model. Rausser Supp. Reply at 21; Pls. Ex. 1 at 11. A log-log model is a type of regression analysis in which "all of the variables included in the model (other than indicator variables and fixed effects) [are] specified as the natural logarithms of their reported values." Leitzinger Rep. ¶ 109. Dr. Rausser controls for the seven explanatory variables identified in the common factors model to remove "the effect of these factors [on prices and] to isolate the effect of the alleged conspiracy on freight rates." Rausser Merits Rep. at 164.

He then adds a number of variables beyond the seven common factors "to summarize the forces of demand and supply." Class Certification Hr'g Tr. (Sept. 27, 2016) at 369; see Rausser Merits Rep. at 168, 187. Dr. Rausser captures the effect of the conspiracy through "a Class Period variable, which takes the value one during the Class Period and zero in the [pre-class] benchmark period . . . ." Rausser Supp. Reply at 22.

Dr. Rausser's damages model also incorporates a constant fuel coefficient. Log-log models are also known as "constant elasticity models" because "the single coefficient estimate associated with each explanatory variable align conceptually with the circumstance in which the elasticity is constant." Leitzinger Rep. ¶ 109. "[T]he coefficient estimated for an explanatory variable in a log-log specification provides what economists refer to as elasticity — i.e., the percentage change in the variable of interest (here, shipping rates) as a result of a small percentage change in the explanatory variable." Id. Using the STB data from 1999 to 2008, Dr. Rausser constructed a regression model to determine the elasticity relationship between fuel prices and variable costs, which he calculated to be 0.103. Rausser Supp. Reply at 44-45; see also supra note 6. Here, "elasticity" refers to the sensitivity of the all-in rate to changes in the price of fuel, but the calculation of the ratio remains the same. An elasticity of 0.103 means "that a 100% increase in fuel costs would be associated with a 10.3% increase in variable costs per ton-mile." Rausser Supp. Reply at 44-45.[8] Dr. Rausser then incorporates 0.103 as a constant fuel coefficient in the damages model. Id. at 45.

[8] In previous iterations of his damages model, when Dr. Rausser did not have the STB data, he calculated a fuel elasticity of 0.024 and 0.032. See Pls. Supp. Reply at 12. For the purposes of calculating damages, the higher the fuel elasticity coefficient, the lower the amount of damages. Class Certification Hr'g Tr. (Sept. 26, 2016) at 97. In other words, Dr. Rausser initially calculated a larger amount of damages than he now does.

Dr. Rausser's damages model uses a benchmark comparison between a period before the alleged conspiracy occurred and a period affected by the alleged conspiracy. Rausser Supp. Reply at 22. Dr. Rausser selected a three-and-one-half year benchmark period — the period before the alleged conspiracy — that includes more than 50 million transactions. Class Certification Hr'g Tr. (Sept. 27, 2016) at 368. In 2013, Dr. Rausser incorporated data from the STB, which included another 2 million transactions, into the pre-class benchmark period. Id. at 370; Pls. Ex. 1 at 11. Dr. Rausser's damages model incorporates 40 million transactions in his class period. Pls. Ex. 1 at 11; Class Certification Hr'g Tr. (Sept. 27, 2016) at 370-71.[9]

After running his damages model on 100% of the available transaction data, Dr. Rausser found that the damages model reveals "a structural break in the relationship between fuel prices and freight rates, coincidental with the start of the conspiracy." Rausser Merits Rep. at 170; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 400. According to Dr. Rausser, "[i]n the absence of an intervening event, such as an agreement among the Defendants as alleged by Plaintiffs, the historical relationship between freight rates and fuel prices would generally be expected to continue," and "the data instead show the existence of a statistically significant structural break in that relationship[,] which is consistent with the record evidence of the alleged conspiracy." Rausser Merits Rep. at 7; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 374-75. This structural break at the beginning of the class period can, in Dr. Rausser's view, constitute common evidence of class-wide impact. Rausser Merits Rep. at 170.

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[9] In earlier expert reports, Dr. Rausser has reported that his damages model incorporates a total of approximately 15 million transactions, "approximately 8.6 million transactions from the benchmark period and 5.7 million transactions from the Class Period." Rausser Supp. Reply at 23.

Using defendants' transaction data from the pre-class period as a benchmark, Dr. Rausser also concludes that a common methodology "shows that freight rates were higher during the Class Period than [can] be explained by economic forces other than the alleged price-fixing conspiracy." Rausser Merits Rep. at 10. Dr. Rausser calculated an average weekly overcharge of 9.8% during the class period, Rausser Supp. Reply at 47, for a total of approximately $7.9 billion in damages. Rausser Merits Reply at 250 & Table 105.[10]

At the remand class certification hearing, Dr. Rausser testified that his model is "consistent with economic logic" and "fully aligned with the discovery record." Class Certification Hr'g Tr. (Sept. 27, 2016) at 371, 377; see also Pls. Ex. 1 at 12. Dr. Rausser also conducted 50 tests to evaluate the robustness and reliability of the damages model. See Pls. Ex. 1 at 12; Class Certification Hr'g Tr. (Sept. 27, 2016) at 375-76. These tests included removing categories of shippers, changing the measurements of key variables, and testing for any non-randomness in the error term. See Pls. Ex. 1 at 12; Class Certification Hr'g Tr. (Sept. 27, 2016) at 375-76. Dr. Rausser determined that these tests did not show significant changes in the model or changes in the potential overcharges, and he concluded that his damages model was robust and reliable. Class Certification Hr'g Tr. (Sept. 27, 2016) at 376.

"[R]egression analysis is generally a reliable method for determining damages in antitrust cases and is 'a mainstream tool in economic study.'" In re High-Tech Emp. Antitrust Litig., 2014 WL 1351040, at *14 (quoting In re Indus. Silicon Antitrust Litig., No. 95-2104, 1998 WL 1031507, at *2 (W.D. Pa. Oct. 13, 1998)). Dr. Rausser's use of a class period variable

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[10] An "overcharge" refers to the percentage increase in freight rates that putative class members suffered as a result of defendants' alleged conduct. See Rausser Merits Rep. at 169; see also IIA PHILLIP E. AREEDA ET AL., ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION ¶ 395 (4th ed. 2015).

to capture the effect of the conspiracy is also a widely accepted method to compute damages in price-fixing cases. See Johnathan B. Baker & Daniel L. Rubinfeld, Empirical Methods in Antitrust Litigation: Review and Critique, AM. L. & ECON. REV. 386, 392 (1999). Although defendants and their experts criticize Dr. Rausser's use of a log-log model with a constant fuel coefficient, see infra at 142-52, arguments about whether an expert should have used an alternative method typically are not grounds for exclusion under Daubert. See In re Urethane Antitrust Litig., 2012 WL 6681783, at *7. "[A]rguments about which method is superior for use in this case" go to the weight of Dr. Rausser's opinions, not to their admissibility under Rule 702. Id.

Dr. Kalt also argues that Dr. Rausser committed data error when using the STB data to calculate fuel elasticity because Dr. Rausser did not account for a known change in the way the STB reported variable costs for intermodal shippers. See Kalt Class Rep. ¶¶ 58-64. To correct for the error, Dr. Kalt recommended excluding the STB intermodal data — 24% of the data — before calculating fuel elasticity. Id. ¶ 59. Dr. Kalt then calculates a higher fuel coefficient of 0.222, which would result in lower damages. Id. ¶¶ 59-60. Dr. Rausser replies that Dr. Kalt has misinterpreted how he used the STB data and that Dr. Kalt provides no real support for why the appropriate response to a minor reporting change by the STB is to exclude relevant data. Rausser Supp. Reply at 53. According to Dr. Rausser, the STB has never reported that "the costs it calculated for that period were inaccurate, unreliable or unusable for research purposes." Id. Dr. Kalt's criticisms do not show that the STB data were irrelevant or unreliable; he simply disputes Dr. Rausser's use of the data. Again, the Court concludes that these arguments go to the weight of the opinion, rather than to the admissibility. See In re Scrap Metal Antitrust Litig., 527 F.3d 517, 531-32 (6th Cir. 2008).

Defendants argue that Dr. Rausser's model generates false positives, particularly when the model is run on subsets of data, such as legacy shipments or local carload shipments (under pre-class period fuel surcharges). See, e.g., Kalt Class Rep. ¶¶ 42-43, 73-75; Kalt Class Sur-Reply ¶¶ 9, 42-43, 45. As Judge Pratter noted in In re Processed Egg Products Antitrust Litigation, "[i]t is intuitive that what would adequately describe the data as a whole might not accurately describe a certain subset of the data — and curious results like those noted by Defendants are to be expected." 81 F. Supp. 3d at 434. Dr. Rausser created the damages model using sufficient data and widely accepted methods, and the model is testable by defendants' experts and plaintiffs' supplemental experts. This is sufficient for admissibility under Rule 702 and Daubert. Id. But "just because the Court has found Dr. Rausser's [damages] model reliable enough for Daubert purposes does not mean that Defendants cannot argue that the curious results uncovered [by their experts] make the regression model unconvincing for purposes for class certification." Id. The Court will fully explore defendants' criticisms regarding the damages model's alleged propensity for false positives, see infra at 159-65, 173-82, but that is an examination appropriately for class certification, not for Daubert.

Dr. Rausser's damages model was the focus of the D.C. Circuit's decision under Rule 23, and it is at the heart of the parties' arguments on remand. But the Court finds no reasons to exclude Dr. Rausser's damages model as irrelevant or unreliable under Daubert. Dr. Rausser's model incorporates millions of data points, provided by the defendants and the STB. In constructing his damages model, Dr. Rausser used methods widely accepted in antitrust cases. The Court therefore concludes that Dr. Rausser's damages model is admissible under Daubert and Rule 702. The Court, however, will conduct a rigorous analysis, as instructed by

the D.C. Circuit, regarding whether Dr. Rausser's model is a reliable means of proving class-wide impact and damages.

f. Legacy Contracts

On appeal, defendants argued that Dr. Rausser's damages model yields overcharges for "legacy contracts, i.e., those shippers who, during the Class Period, were bound by rates negotiated before any conspiratorial behavior was alleged to have occurred." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252. Defendants initially sought to test Dr. Rausser's damages model on legacy contracts because Dr. Rausser had "identified a set of legacy shipments in his original class certification report, purportedly to ensure that 'unaffected' shippers were not included in the class." Defs. Supp. Opp. at 46 (citing Rausser Class Rep. at 120-21). Shippers with only legacy contracts are not members of the class; they have been excluded from the class definition proposed by plaintiffs and accepted by the Court. See infra at 110-11. The legacy shippers issue arose in this litigation because defendants have asserted that legacy shippers are a "clean" group of shippers — who were unaffected by the alleged conspiracy — and therefore can be used to test whether Dr. Rausser's damages model shows overcharges for only those shippers harmed by the conspiracy. See Defs. Supp. Opp. at 46-48. Defendants' first class certification expert, Dr. Robert D. Willig, tested the damages model on legacy shipments and found overcharges, or "false positives," a critique which defendants presented on appeal. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252.

The court of appeals in its opinion focused on "defendants' concern that [Dr. Rausser's] damages model yielded false positives with respect to legacy shippers" and referenced Dr. Rausser's "concession" that his damages model measured overcharges to both

legacy shippers and class members. In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 253. The D.C. Circuit remanded the case for this Court to consider, in light of the decision in Comcast, defendants' argument that Dr. Rausser's damages model is prone to false positives and therefore "detects injury where none could exist." Id. at 252. Although the court of appeals noted that Dr. Rausser conceded that his damages model measures "overcharges to legacy shippers and class members alike," id. at 253, Dr. Rausser on remand maintains that it has always been his opinion that legacy shippers would have been harmed by the alleged conspiracy, regardless of whether they are included in the class definition chosen by plaintiffs' counsel. Rausser Supp. Rep. at 20.[11]

With respect to legacy shipments, Dr. Rausser states that defendants' false positives argument is based on a "false premise" that "the alleged conspiracy could not have affected shipments under legacy contracts, because the FSC formulas embedded in those contracts were agreed upon between railroad and shipper before the alleged conspiracy was [underway]." Rausser Supp. Rep. at 4. There are two bases from which Dr. Rausser concludes that legacy shipments during the class period were harmed: (1) there was a change in the economic environment during the class period and all shipments, including legacy shipments, were affected by the alleged conspiracy, id. at 5, and (2) his analysis of legacy contracts — his so-called "legacy decomposition" — indicates that many of the identified legacy shipments were not "true" legacy shipments because the shipments were not moved under contracts that were bound by rates negotiated before the start of the alleged conspiracy. Id. at 6. Based on these

[11] The Court notes that it is more accurate to describe this as a dispute involving legacy shipments, not legacy shippers, because "some of the shippers are the same shippers that [are] in the class because they entered into new contracts during the class period." Class Certification Hr'g Tr. (Sept. 26, 2016) at 200.

findings, Dr. Rausser concludes that his damages model is not prone to false positives and reliably calculates overcharges for legacy shipments. Id. at 37. Defendants challenge both aspects of Dr. Rausser's expert opinion regarding legacy shipments.

The Court first addresses Dr. Rausser's expert opinion that there was a change in the economic environment such that all shipments during the class period — including legacy shipments — were harmed by the alleged conspiracy. According to Dr. Rausser, "[w]hen FSC formulas were first embedded in legacy contracts, actual FSC rates were small and transient, and had very little economic effect on shippers." Rausser Supp. Rep. at 5. During the class period, he says, "when [the] model finds overcharges on shipments that have been identified as legacy shipments, FSC rates were very high and had a sizeable economic effect on shippers, every month for years." Id. To support this conclusion, Dr. Rausser cites examples from the documentary record. See, e.g., id. at 7-10. He notes that fuel surcharges were only "theoretically billable" in the pre-class period because shippers often resisted fuel surcharge application through negotiation and waivers. Id. at 8-10. Dr. Rausser opines that, absent an alleged conspiracy, resistance to the application of fuel surcharges would have continued during the class period. See id. at 11. To put it another way, "[i]t is reasonable to expect that, in an environment of competition, Defendants would have yielded to resistance from shippers (including legacy shippers) and reduced or offset the dramatically increasing FSC rates that Defendants applied during the Class Period, either by adjusting those FSC rates, re-pricing base rates or offering other concessions." Id. at 5.

Defendants challenge this opinion, arguing that Dr. Rausser has offered no quantitative analysis to support this proposition. Defs. Supp. Opp. at 56. Dr. Kalt opines that Dr. Rausser's "enforcement theory assumes that, having negotiated for contractual protection

against the risk of rising fuel prices, the railroads (absent conspiracy) would then have waived the very protection for which they had negotiated," and that "[s]uch an extreme hypothesis requires strong evidence, but there is none . . . ." Kalt Class Rep. ¶ 118. Dr. Kalt also looked to the transaction data to determine whether Dr. Rausser's opinion — that absent a conspiracy, legacy shippers would have been able to renegotiate their fuel surcharges or obtain waivers — is consistent with defendants' transaction data. See Class Certification Hr'g Tr. (Sept. 29, 2016) at 826-27.

To determine what level of waivers would be needed to explain the overcharges calculated by the damages model for legacy shipments, Dr. Kalt applied the 2.9% waiver rate identified by Dr. Rausser for the pre-class period to the but-for world during the class period. Kalt Class Rep. ¶ 115.[12] Dr. Kalt determined that defendants would have needed to waive 75.5% of fuel surcharges on legacy shipments to explain the overcharges, that is, to show no overcharges for legacy shipments. Id. From this finding, Dr. Kalt concludes that "[t]here is simply no support for such massive non-collection of FSCs in [Dr.] Rausser's pre-Class benchmark period or in the anecdotes that he cites." Id.; see also Class Certification Hr'g Tr. (Sept. 29, 2016) at 837-39.

This dispute goes to the weight to be accorded each expert's opinion under Rule 23(b), not to its admissibility under Daubert and Rule 702. See Robinson v. District of Columbia, 74 F. Supp. 3d 190, 200 (D.D.C. 2014) (citing Joy v. Bell Helicopter Textron, Inc., 999 F.2d 549, 567 (D.C. Cir. 1993)). To support his opinion, Dr. Rausser principally relies on

[12] This 2.9% figure is derived from the NS data. Kalt Class Rep. ¶ 115. Dr. Kalt took this 2.9% waiver rate from Dr. Rausser's work. See Rausser Merits Reply, Table 80. Neither expert calculated the rate at which the other defendants waived fuel surcharges during the pre-class period.

the documentary record from the pre-class and class periods. See Rausser Supp. Rep. at 5, 7-11. The opinion is relevant to the issues to be decided under Rule 23(b), namely whether plaintiffs have offered reliable means of proving class-wide injury. See FED. R. EVID. 702(a). The Court may admit expert opinion even where — as here — the factual bases for the opinion are weak. See Robinson v. District of Columbia, 74 F. Supp. 3d at 200. The Court will determine what weight to afford Dr. Rausser's opinion, given its limited support, under Rule 23.

Second, Dr. Rausser offers his "legacy decomposition" analysis to demonstrate that the majority of legacy shipments were affected by the alleged conspiracy. See Rausser Supp. Rep. at 35-75. According to Dr. Rausser, "an examination of the contracts that the Defendants have identified as legacy contracts — the computed overcharges [that] form the basis of the Defendants' false positive argument — reveals that many of those contracts simply do not satisfy the description of legacy contracts that the Defendants provided to the Court of Appeals in support of their argument." Id. at 6.

All four defendants provided plaintiffs with transaction data and potential methods for identifying which transactions related to legacy contracts, which included "a total of 29,374,608 legacy shipments during the Class Period." Rausser Supp. Rep. at 37; see id. at 24-26. After reviewing the data, Dr. Rausser concluded that 68.68% of legacy shipments (or 13,029,917 shipments) moved under contracts that were either (1) "self-adjusting or adjustable to conspiratorial FSC formulas prevailing as of the date of shipment (rather than the effective date of the contract) or (2) were created once the conspiracy was beginning (after March 1, 2003)." Id. at 37-38 & Table 28. Specifically, Dr. Rausser determined that the legacy shipments for which he has adequate fuel surcharge data fall into one of four categories: (1) 42.68% of legacy shipments moved under contract provisions with "self-adjusting fuel surcharges," meaning that

the contract provision stated that the shipper would pay the fuel surcharge existing at the time of the shipment, rather than a fuel surcharge price agreed upon before the alleged conspiracy ("Category 1"); (2) 26.00% of legacy shipments moved under a fuel surcharge provision created during the conspiracy period ("Category 2"); (3) 5.36% of legacy shipments moved under contract provisions entered into during the formation of the conspiracy, March 1 through July 1, 2003; and (4) 6.36% of legacy shipments moved under contracts entered into on or after July 1, 2003. Id. at 38 & Table 28. In other words, these four categories of shipments — totaling 80.4% — were not legacy shipments at all.[13]

Dr. Rausser asserts that these figures are actually understated because defendants' methods for identifying legacy shipments overestimate the number of legacy shipments. See Rausser Supp. Rep. at 38-39. Dr. Rausser states that there is a more accurate method for identifying legacy shipments for one defendant, NS. See id. at 38. When using his preferred method for identifying NS legacy shipments, Dr. Rausser finds that 81.86% of the total legacy shipments fall into his categories 1 and 2 as opposed to only 68.68%. Id. at 39 & Table 31. Based on the available legacy contract data, Dr. Rausser concludes that defendants' description of legacy contracts is fundamentally flawed and that the majority of legacy contracts were harmed by the alleged conspiracy. Id. at 35-36.

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[13] Dr. Rausser notes that when examining legacy contracts, as opposed to legacy shipments, "90 percent of Legacy Contracts updated their FSCs or used FSCs that were implemented during the Class and/or Conspiracy Periods." Pls. Ex. 1 at 16; see also Rausser Supp. Rep., Table 31. Specifically, (1) 45.21% of the legacy contracts had "self-adjusting fuel surcharges" ("Category 1"); (2) 32.69% of legacy contracts applied a fuel surcharge formula that did not exist before the conspiracy period ("Category 2"); (3) 11.95% of legacy contracts were entered into during the formation of the conspiracy, March 1 through July 1, 2003; and (4) 0.34% of the legacy contracts were entered into during the class period. Id.; see also Pls. Ex. 1 at 16.

Dr. Kalt does not specifically challenge Dr. Rausser's legacy decomposition analysis; nor did he replicate Dr. Rausser's analysis. See Class Certification Hr'g Tr. (Sept. 29, 2016) at 968, 988. He focused on other critiques of the reliability of Dr. Rausser's damages model. Id. Defendants, however, offer numerous challenges to Dr. Rausser's legacy decomposition analysis. Defendants assert that Dr. Rausser's conclusions are misleading because Dr. Rausser excluded from his analysis approximately 10.4 million of the 29.3 million legacy shipments identified by defendants. Defs. Supp. Opp. at 51; see also Rausser Supp. Rep. at 37 & n.124; OD Ex. 4, Rausser Dep. (Mar. 4, 2014) at 100, 112. Dr. Rausser stated that he excluded the 10.4 million legacy shipments because there was no fuel surcharge program information in the transaction data he was provided for those shipments. See Rausser Supp. Rep. at 37 & n.124; OD Ex. 4, Rausser Dep. (Mar. 4, 2014) at 108-09. When Dr. Rausser concludes that 68.68% of the legacy shipments are not "true" legacy shipments, he is referring to 68.68% of the 18,972,173 legacy shipments for which he had adequate fuel surcharge information, not all legacy shipments. His conclusions therefore relate only to approximately two-thirds of the legacy shipments identified by defendants.

Defendants point to the BNSF legacy shipment data as a specific example of how Dr. Rausser's conclusions are misleading, given that he excluded 10.4 million shipments from his analysis. Defs. Supp. Opp. at 51. Dr. Rausser excluded all of the BNSF intermodal data as part of the 10.4 million shipments that he excluded from his legacy decomposition analysis. These BNSF intermodal shipments accounted for 68% of BNSF's identified legacy shipments. Rausser Supp. Rep. at 45 & n.160. After excluding all of the BNSF intermodal shipments from his analysis, Dr. Rausser concluded that 89.7% of all — that is, the remaining — BNSF legacy shipments were not "true" legacy shipments. See id. at 45-46. In response to questioning by

defendants at a deposition, Dr. Rausser acknowledged that he is simply concluding that 89.7% of approximately 32% of the BNSF legacy shipments previously identified are not true legacy shipments. See OD Ex. 4, Rausser Dep. (Mar. 4, 2014) at 245.

Defendants also fault Dr. Rausser for placing legacy contracts in his "Category 1" for self-adjusting contracts without verifying whether the "self-adjustment" had any impact on the fuel surcharge formula. Defs. Supp. Opp. at 53-54. Put differently, Dr. Rausser did not verify that the self-adjusting contracts were actually adjusted to higher, allegedly conspiratorial fuel surcharges. Defendants point to UP's intermodal legacy shipments, which Dr. Rausser said were moved under "self-adjusting" contracts. See Rausser Supp. Rep. at 52. Defendants note that Dr. Rausser previously conceded "that the only adjustments to UP's intermodal formula 'had the effect of reducing the fuel surcharge.'" Defs. Supp. Opp. at 52 (emphasis in original) (quoting Rausser Merits Reply at 172). According to defendants, "if the Class Period adjustments reduce the fuel surcharge, as Dr. Rausser previously admitted, that makes the damages model's findings of overcharges harder to explain." Id.

Defendants argue that Dr. Rausser's failure to account for whether any adjustments or class period formulas were higher during the class period is especially important given that he opines that 68.68% of the identified legacy shipments fall into his Category 1 (self-adjusting contracts) and Category 2 (formula applied which did not exist during the alleged conspiracy). These omissions in Dr. Rausser's legacy decomposition analysis, defendants argue, illustrate that his analysis provides "no useful information" on the question of whether the damages model detects injury where none could exist. Defs. Supp. Opp. at 54.

The Court concludes that Dr. Rausser's methods for his legacy decomposition analysis are reliable under Rule 702. Dr. Rausser's methodology is sound, and he has explained

for why he excluded 10.4 million legacy shipments from his analysis; the transaction data did not have adequate fuel surcharge program information. See Rothe Dev., Inc. v. Dep't of Defense, 107 F. Supp. 3d at 198. Defendants' experts have not offered any suggestion that Dr. Rausser could have identified the fuel surcharge program information for those excluded shipments. Given that Dr. Rausser could review only two-thirds of the identified legacy shipments, however, the Court will decide what weight to afford Dr. Rausser's legacy decomposition analysis under Rule 23.

B. Dr. Joseph P. Kalt

The Court next turns to Dr. Joseph P. Kalt, the primary expert upon whom defendants rely to counter the expert opinions of Dr. Rausser. Dr. Kalt is the Ford Foundation Professor (Emeritus) of International Political Economy at the John F. Kennedy School of Government at Harvard University and a senior economist with Compass Lexecon, an economic consulting firm. Kalt Class Rep. ¶ 1. He holds a B.A. in economics from Stanford University and a Ph.D. in economics from the University of California, Los Angeles. Id., App. A at 2. Dr. Kalt has taught economics and statistics at Harvard since 1978. Id., App. A at 1. Dr. Kalt has published widely on issues related to government regulation and antitrust enforcement, and has delivered presentations on the rail industry to the United States House of Representatives, the United States Senate, and the STB. Id., App. A at 12-14. Plaintiffs stipulated to Dr. Kalt's qualifications under Rule 702 as an expert in the fields of economics and econometrics. Class Certification Hr'g Tr. (Sept. 27, 2016) at 330. The Court therefore finds that Dr. Kalt is qualified as an expert in the fields of economics and econometrics based on his education and experience.

As noted supra at 17, the Court has already denied plaintiffs' motion to exclude Dr. Kalt on Daubert grounds before the class certification hearing. In re Rail Freight Fuel

Surcharge Antitrust Litig., 2016 WL 2962186, at *3. The Court explained that there was no requirement to decide the reliability of an expert's methodology in advance of the class certification hearing, only that it be confident that an expert meets the Daubert reliability standard before it moves on to consider the plaintiffs' satisfaction of the requisites of Rule 23. Id. at *1-2. The Court did not then address "each of the six separate bases asserted by plaintiffs for the exclusion of Dr. Kalt's opinions" because

> most, if not all of them, are not valid Daubert arguments at all because they do not challenge the principles or methodologies that Dr. Kalt employed. Rather, they are attacks on Dr. Kalt's theories or his responses to the opinions, regression analyses, and models of plaintiffs' experts. The Court will determine at the class certification hearing — consistent with Daubert and Rule 702 — the relevance, reliability, admissibility, and weight it should afford the reports, testimony, and opinions of all experts.

Id. at *2. The Court now proceeds to a discussion of Dr. Kalt's expert opinions and plaintiffs' bases for seeking to exclude them under Daubert and Rule 702. See generally Kalt Daubert Mot. Dr. Kalt completed three expert reports in this case: (1) Kalt Merits Report (Mar. 1, 2013); (2) Kalt Class Report (May 6, 2014); and (3) Kalt Class Sur-Reply (July 21, 2014).[14]

The Court considers Dr. Kalt's expert opinion to consist of five topics: he (1) disputes Dr. Rausser's analysis concerning the aggressiveness and coverage of fuel surcharges in the pre-class period and class period; (2) notes the "false positives" generated by

[14] Defendants have never filed the complete version of Dr. Kalt's 384-page Merits Report with this Court, only exhibit 12 to their post-remand opposition to plaintiffs' motion for class certification, which contains 66 pages of excerpts from that report. See OD Ex. 12. Several of the 66 pages include truncated paragraphs, which makes it impossible for the Court to fully review even those portions of the Kalt Merits Report contained in exhibit 12. See, e.g., id. at 77, 90, 137. Presumably, the full Kalt Merits Report would be made available to the fact-finder if there were a trial. Where it is not possible for the Court to review the portions of Dr. Kalt's merits report that defendants cite, the Court has instead relied on Dr. Kalt's Class Report, his Sur-Reply Report, and his testimony at the class certification hearing.

Dr. Rausser's damages model and addresses the possible causes, including Dr. Rausser's use of a constant as opposed to a variable fuel coefficient; (3) offers a structural break analysis to demonstrate that Dr. Rausser's damages model generates structural breaks and overcharges throughout the pre-class and class periods; (4) opines that Dr. Rausser's damages model does not allow defendants ordinary fuel cost recovery; and (5) criticizes Dr. Rausser's damages model as unreliable for generating shipments with negative overcharges, including shippers whose every shipment had negative overcharges (so-called "uninjured class members"). The Court will determine admissibility under Rule 702 for Dr. Kalt's opinions with respect to each of these arguments, considering, where appropriate, the plaintiffs' reasons for seeking to exclude Dr. Kalt contained in their Daubert motion.

1. Aggressiveness and Coverage of Fuel Surcharges

Dr. Kalt disputes Dr. Rausser's contentions that class period fuel surcharges were fundamentally different from pre-class period fuel surcharges due to the uniform application of more onerous fuel surcharges formulas and a refusal to negotiate offsets or discounts during the class period. See, e.g., Kalt Class Rep. ¶¶ 93-118. Put differently, Dr. Kalt challenges Dr. Rausser's claim that class period fuel surcharges were fundamentally different from pre-class period fuel surcharges. Dr. Kalt bases his opinion on his study of the raw "actual market data, the actual transactions that [Dr.] Rausser uses and [that] he says show the effects of the alleged conspiracy in this case." Class Certification Hr'g Tr. (Sept. 29, 2016) at 823.

a. Earning Power

Dr. Kalt introduces the metric of "earning power" — "the percentage surcharge rates generated by the FSC formulas for the same fuel prices" — to explain why class period fuel

surcharges were not in fact more onerous or aggressive than pre-class period fuel surcharges. Kalt Class Rep. ¶ 95 & Figure 17. Dr. Kalt contends that Dr. Rausser's damages model is a model "solely of all-in rates" that is unreliable insofar as it includes "no variable that captures the presence or absence of a fuel surcharge" or "that captures whether it was aggressive or not aggressive." Class Certification Hr'g Tr. (Sept. 29, 2016) at 824. Dr. Kalt argues that the revenue defendants generated from class period fuel surcharges is nearly identical to, if not less than, the revenue defendants would have generated if they had applied the competitively negotiated fuel surcharges from the pre-class period to all class period traffic. Kalt Class Rep. ¶¶ 98-99 & Figures 18, 19.

Plaintiffs argue that Dr. Kalt's earning power metric is unreliable under Daubert because it is inconsistent with the "discovery record" and "market realities" during the pre-class period, which had only modest fuel surcharge coverage and permitted discounting of those fuel surcharges that did exist. See Kalt Daubert Mot. at 12. Plaintiffs contend that looking at the earning power of pre-class period fuel surcharges "tells us nothing about the perceived 'earning power' at the time of" the conspiratorial conduct because "[n]o railroad had a crystal ball to tell it what fuel prices would be in the coming years." Id. at 15-16 (emphasis in original). In plaintiffs' view, Dr. Kalt's earning power argument is just a "redux" of the same expert opinion of his that the district court excluded in In re Electronic Books Antitrust Litigation, No. 11-MD-2293, 2014 WL 1282298 (S.D.N.Y. Mar. 28, 2014). Kalt Daubert Mot. at 11-12.

The Court disagrees. In In re Electronic Books Antitrust Litigation, Judge Denise Cote of the United States District Court for the Southern District of New York excluded Dr. Kalt's expert opinion on Daubert grounds because his analysis misclassified data in such a way as to be "misleading," 2014 WL 1282298, at *10, relied on a theory of analysis ungrounded

in "any literature within the field of econometrics," id. at *8, based its conclusions on data for which there was no date, id. at *9-10, and failed to "control for systematic factors." Id. at *10. There is no comparison between the defects Judge Cote found and Dr. Kalt's earning power argument here. Notably, plaintiffs do not take issue with the statistical rigor underlying Dr. Kalt's earning power metric — only its fit as it relates to the facts of this case and its applicability to legal conclusions pertinent to class certification. See Kalt Daubert Mot. at 14-15. But those alleged deficiencies in earning power as a method of statistical analysis go to its weight and not its admissibility. See Bazemore v. Friday, 478 U.S. at 400 (reversing exclusion of regression analysis that failed to properly select the appropriate variables); see also Hemmings v. Tidyman's Inc., 285 F.3d 1174, 1188 (9th Cir. 2002) ("[I]n most cases, objections to the inadequacies of a study are more appropriately considered an objection going to the weight of the evidence rather than its admissibility."). The Court therefore concludes that Dr. Kalt's earning power analysis satisfies Daubert and Rule 702.

b. Coverage: Application, Negotiation, and Discounting of Fuel Surcharges

Notwithstanding whether the class period fuel surcharges were more onerous or aggressive than those in the pre-class period, Dr. Kalt also disputes Dr. Rausser's claims regarding the coverage or application of fuel surcharges during the pre-class period as opposed to the class period. See, e.g., Kalt Class Rep. ¶¶ 101-15. Dr. Kalt argues that defendants increasingly "included FSC provisions with very high frequency" in new contracts they entered into between January 2002 and the start of the alleged conspiracy in March 2003, when those provisions appear in "at least 60%" of new contracts. Id. ¶ 105 & Figure 21. He asserts that this indicates that the shift toward more widespread application of fuel surcharges began in the pre-class period, before the onset of the alleged conspiracy. Id. ¶ 105. Dr. Kalt then suggests

that fuel surcharge coverage did not spike during the class period, and remained well below the 100% or near universal coverage Dr. Rausser claims. Id. ¶¶ 105-06. Dr. Kalt disputes what he describes as Dr. Rausser's "no escape" or "conspiracy-as-enforcement" theory, i.e., the idea that, even if fuel surcharge coverage remained relatively constant from the pre-class period to the class period, defendants stopped discounting and offsetting fuel surcharges during the class period. Id. ¶ 109. Specifically, Dr. Kalt argues that shippers negotiated and obtained discounts on class period fuel surcharges, and that Dr. Rausser's evidence to the contrary is grounded only in "selective anecdotes." Id. ¶ 113. Dr. Kalt also ran an exercise showing that NS's "collection rate" for fuel surcharges only modestly increased from 97.1% in 2002 to 98.5% in 2006. Id. ¶ 111 & Figure 22.[15]

Dr. Kalt draws two conclusions from this data. First, he concludes that Dr. Rausser failed to accurately model an aspect of the "but-for world," namely, the level of fuel surcharge coverage or application that would have existed during the class period in the absence of the alleged conspiracy. Kalt Class Rep. ¶¶ 15-20. Dr. Kalt explains that Dr. Rausser's failure to model coverage is manifest when one asks, "what level of non-enforcement of FSCs would the but-for world require to eliminate overcharges found by [Dr.] Rausser's model?" Id. ¶¶ 114-15 & Figure 23. Dr. Kalt claims that, "in the but-for world Defendants would have had to have waived or otherwise not collected 82.5% of FSC revenue in order for all-in but-for prices to be pushed to the level implied by [Dr.] Rausser's damage calculations for class shippers." Id. ¶ 115 (emphasis in original). Put differently, Dr. Kalt suggests that, absent the alleged conspiracy, shippers would have had to negotiate waivers of 82.5% of their class period fuel surcharges in order to justify the damages Dr. Rausser's model estimates.

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[15] Dr. Kalt did not perform any similar coverage exercises for the other defendants.

Second, Dr. Kalt asserts that a shipper's ability to obtain a fuel surcharge waiver or discount during the class period depended entirely on "shipper-specific facts and circumstances" that Dr. Rausser did not model. See Kalt Class Rep. ¶¶ 119-21. Those circumstances include, inter alia, "whether the shipper ha[d] feasible access to non-Defendant railroads; the ability to switch to trucks or barges; the importance and bargaining power of a shipper to a Defendant; the knowledge and importance of rail shipping costs in a shipper's overall costs of doing business; and myriad other elements of leverage and bargaining that would have enhanced or diminished a shipper's ability to renegotiate, waive, or breach contract terms so as to escape putatively excessive fuel surcharges." Id. ¶ 110. According to Dr. Kalt, Dr. Rausser's theory that shippers were harmed from the aggressive enforcement of fuel surcharges — regardless of a change in their fuel surcharge — turns on highly individualized inquiries. Id.

Dr. Kalt's exercises attempt to demonstrate (1) that Dr. Rausser's "no escape" or "conspiracy-as-enforcement" hypothesis is inconsistent with defendants' pre-class period waiver rates, and (2) the importance of shipper-specific facts and circumstances for determining whether a shipper would have received a waiver in absence of the conspiracy. Plaintiffs make no argument that the transaction data upon which Dr. Kalt built his exercises are irrelevant or unreliable — nor could they, because it is the same data upon which Dr. Rausser built his models. The Court therefore concludes that Dr. Kalt's exercises relating to discounting and negotiation of fuel surcharges are valid expert opinions admissible under Daubert and Rule 702.

2. False Positives

Dr. Kalt next tested Dr. Rausser's damages model in three circumstances and found overcharges "where there should be none," which Dr. Kalt labels "false positives":

(1) legacy shipments, (2) rates equal to variable costs, and (3) pre-class period fuel surcharges. Kalt Class Rep. ¶ 5.[16] The Court will address each of the ways Dr. Kalt tested Dr. Rausser's model for false positives and the reason that Dr. Kalt posits for each of these the false positives — Dr. Rausser's use of a constant fuel coefficient — as well as the objections plaintiffs have raised to Dr. Kalt's analysis under Daubert. The Court begins with a discussion of the debate between Dr. Kalt and Dr. Rausser concerning whether a constant or variable fuel coefficient should have been used in Dr. Rausser's damages model.

a. Variable Fuel Coefficient

Dr. Kalt argues that Dr. Rausser's damages model yields false positives when run on legacy shipments, rates equal to variable costs, and pre-class period fuel surcharges because it uses a constant fuel elasticity coefficient instead of a variable fuel coefficient. Kalt Class Rep. ¶¶ 45, 49.[17] Dr. Kalt considers this to be a fatal flaw in Dr. Rausser's work, id. ¶ 44, an "economic error" that violates "simple mathematics." Id. ¶ 13. He also says it is inconsistent

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[16] Dr. Kalt offers one additional argument that sounds in the language of a false positive, but he does not label it as such. Dr. Kalt found that "38% of shipments, accounting for $15 billion (35% of Class revenue), have implausibly high" overcharges that exceed the fuel surcharge on the shipment. Kalt Class Sur-Reply ¶ 63 & Figure SR-11. Dr. Kalt argues that these results — that Dr. Rausser's damages model calculates overcharges for given shipments in excess of the fuel surcharge on those shipments — are a false positive because plaintiffs' theory of liability is grounded only in supra-competitive fuel surcharge rates. Id. ¶ 63. Plaintiffs do not dispute this piece of Dr. Kalt's expert opinion under Daubert, but the Court will assess the argument for purposes of Rule 23(b)(3). See infra at 164-65.

[17] Dr. Rausser's damages model uses a constant fuel elasticity coefficient in order to calculate a single average weekly overcharge that is an estimate of class-wide injury. Dr. Kalt argues that using a log-log model to calculate a constant elasticity is inappropriate, but acknowledges that using a log-log model to calculate antitrust damages — the second step of the damages model — is a standard econometric practice. See Class Certification Hr'g Tr. (Sept. 29, 2016) at 858.

with the approaches of each econometric study Dr. Rausser cites in his Merits Report, and "renders [Dr. Rausser's] models unambiguously unreliable." Id. ¶ 13; see also id. ¶ 54.

Dr. Kalt believes that a variable fuel coefficient is the only appropriate metric because "as fuel becomes a larger share of railroads' overall costs, a given percentage change in fuel prices will generate a larger percentage change in competitive rail rates." Kalt Class Rep. ¶ 44. Dr. Kalt ran exercises to show that Dr. Rausser's constant fuel coefficient impermissibly allows Dr. Rausser's model to transform defendants' ordinary fuel cost recovery, i.e., their ability to pass through increases in fuel costs to shippers, into damages. Id. ¶¶ 51-53 & Figure 9. Dr. Kalt contends that Dr. Rausser's model generates unrealistically low but-for prices, which — by virtue of its data construction — causes it to interpret as damages the fuel costs that defendants would pass through to shippers (i.e., recover) in the ordinary course of business. Id.[18]

At the class certification hearing, Dr. Kalt used what plaintiffs call his "teaching tool" to explain why fuel price elasticity is variable. Class Certification Hr'g Tr. (Sept. 29, 2016) at 852-54; see also Kalt Daubert Mot. at 22-29. The teaching tool attempts to show how fuel price elasticity varies by comparing two situations where defendants have overall costs of $100, but in one instance fuel costs $10 and in the other fuel costs $20. Class Certification Hr'g Tr. (Sept. 29, 2016) at 852. Assuming that fuel costs double (from $10 to $20 in the first instance

[18] In their Daubert motion, plaintiffs also challenge Dr. Kalt's work "re-specifying" Dr. Rausser's model to incorporate a variable fuel coefficient, as opposed to Dr. Rausser's constant fuel coefficient. Kalt Daubert Mot. at 24. Plaintiffs attempted to challenge this piece of Dr. Kalt's work again at the class certification hearing, which Dr. Kalt never submitted to the Court, but was included in his work papers. Class Certification Hr'g Tr. (Sept. 29, 2016) at 922. Defendants argued at the class certification hearing that Dr. Kalt was "not sponsoring" these work papers, and therefore that Dr. Kalt made no assertion that he could run Dr. Rausser's damages model using a variable fuel coefficient. Class Certification Hr'g Tr. (Sept. 26, 2016) at 89; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 391-92. As there is no expert opinion to exclude, the Court rejects plaintiffs' arguments with respect to this issue.

and from $20 to $40 in the second) and defendants can pass through all fuel costs to shippers, there will be different elasticities for the two situations. Id. at 854. In the first instance where fuel costs doubled from $10 to $20, overall costs grew from $100 to $110 and the elasticity — the change in overall cost (10%) divided by the change in fuel price (100%) — is 0.100. Kalt Class Rep. ¶¶ 52-53. In the situation where fuel costs doubled from $20 to $40, overall costs grew from $100 to $120 and the elasticity — the change in overall cost (20%) divided by the change in fuel price (100%) — is 0.200. Class Certification Hr'g Tr. (Sept. 29, 2016) at 854. Dr. Kalt believes this exercise demonstrates that a constant fuel coefficient as used by Dr. Rausser cannot account for the substantial changes in fuel prices during the class period. Kalt Class Rep. ¶ 45.[19] Dr. Kalt also states that Dr. Rausser should have used a variable fuel coefficient, which is a per se characteristic of a "translog production function," as opposed to the constant fuel coefficient in the damages model. See Class Certification Hr'g Tr. (Sept. 29, 2016) at 858; see also id. at 856-57.[20]

Plaintiffs argue that Dr. Kalt's teaching tool is "purely theoretical," and "untethered to basic economic theory, the factual record, and even [Dr. Kalt's] past testimony in

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[19] In addition to critiquing Dr. Rausser's use of a constant fuel coefficient, Dr. Kalt engaged in a separate exercise: he assumed that a constant fuel coefficient was appropriate and then ran Dr. Rausser's model without the problematic STB intermodal data. Kalt Class Rep. ¶ 59. Dr. Kalt calculated an elasticity of 0.222 — more than double Dr. Rausser's 0.103 — which resulted in an average weekly overcharge of 4.0%, less than half of Dr. Rausser's 9.8%. Id. ¶¶ 59-60.

[20] A translog model is "used in econometrics because [it] allows analysts to model complex features of the production function, such as elasticities of substitution, which are functions of the second derivatives of product, cost, or utility functions. The linear model restricts these to equal zero . . . ." WILLIAM H. GREENE, ECONOMETRIC ANALYSIS 58 (7th ed. 2012). Unlike a linear log-log model, it does not demand homogeneity in how it describes the variables in the regression model. Id. at 353. "For the translog cost function, the elasticities of substitution . . . will differ at every data point. It is common to compute them at some central point such as the means of the data." Id.

the case." Kalt Daubert Mot. at 26 (internal quotation marks and citation omitted). They also contend that Dr. Kalt's opinion that Dr. Rausser should have used a variable fuel coefficient is similar to Dr. Kalt's opinion that was excluded in In re Electronic Books Antitrust Litigation. 2014 WL 1282298, at *11. In In re Electronic Books Antitrust Litigation, Judge Cote excluded Dr. Kalt's opinion that the plaintiffs' model was flawed because the plaintiffs' expert had failed to insert a "buzz variable" into the model. Id. That is qualitatively different from the question the Court confronts here: whether a model with a constant elasticity — which the parties sometimes refer to as a "log-log" model — or a model with a variable elasticity — which the parties sometimes refer to as a "translog" model — is the most appropriate and reliable in regression analysis generally, and as applied, to Dr. Rausser's model. The Court therefore declines plaintiffs' invitation to apply Judge Cote's reasoning concerning Dr. Kalt's "buzz" variable in this case.

The Court already has determined that Dr. Rausser's use of a constant fuel elasticity coefficient is a widely accepted econometric method and that "arguments about which method is superior for use in this case" go to weight, not admissibility. In re Urethane Antitrust Litig., 2012 WL 6681783, at *7; see also supra at 44-45, 48. The use of a variable fuel coefficient is also an accepted econometric method, as indicated in some of the econometric literature that Dr. Rausser cited favorably in his Merits Reply Report. See Rausser Merits Reply at 247 & nn.735-36; see, e.g., Laura Padilla Angulo, Labour Inputs Substitution During Corporate Restructuring: A Translog Model Approach for US Freight Railroads, 45 APPLIED ECON. 2547-62 (2012); John D. Bitzan & Theodore E. Keeler, Productivity Growth and Some of its Determinants in the Deregulated U.S. Railroad Industry, 70 S. ECON. J. 232-53 (2003). While there is a robust debate in this case over the use of log-log and translog models in regression

analysis, the Court finds that Dr. Kalt's "chosen approaches have a firm basis in contemporary econometrics and cannot simply be dismissed as objectively wrong." In re Air Cargo Shipping Servs. Antitrust Litig., 2014 WL 7882100, at *58; see also In re Vitamin C Antitrust Litig., No. 06-MD-1738, 2012 WL 6675117, at *5 (E.D.N.Y. Dec. 21, 2012). (internal quotation marks and citation omitted) (challenges to "disciplines that require the use of professional judgment . . . may be ultimately viewed as matters in which reasonable experts may differ"). Rule 702 "is broad enough to permit testimony that is the product of competing principles or methods in the same field of expertise." FED. R. EVID. 702 advisory committee's note to 2000 amendment (citing Heller v. Shaw Indus., Inc., 167 F.3d 146, 160 (3d Cir. 1999)). The Court concludes that Dr. Kalt's recommendation to use a variable fuel coefficient — or translog production function — is grounded in the econometric literature and sufficiently reliable under Daubert and Rule 702 to be admitted. With respect to plaintiffs' argument that Dr. Kalt's teaching tool is inconsistent with the facts of this case, the Court will consider what weight to afford Dr. Kalt's opinion in its class certification determination under Rule 23. See Robinson v. District of Columbia, 74 F. Supp. 3d at 200 (internal quotation marks and citation omitted) ("[I]t is not proper for the Court to exclude expert testimony merely because the factual bases for an expert's opinion are weak.").

b. Legacy False Positives

Dr. Kalt finds that Dr. Rausser's damages model calculates a 9.7% average weekly overcharge for legacy shipments, which Dr. Kalt defines as shipments "made during the Class Period under a price authority which was adopted during the pre-Class Period" before the conspiracy allegedly began. Kalt Class Rep. ¶¶ 5-6. According to Dr. Kalt, the "injury or damage for the legacy traffic" in Dr. Rausser's damages model is "virtually indistinguishable from what it produces for class traffic." Class Certification Hr'g Tr. (Sept. 29, 2016) at 834; see

also Kalt Class Rep. ¶ 38 & Figure 2 (showing overcharges for specific legacy shipper-price authorities).

Recall that Dr. Rausser's primary response to charges that his damages model produces false positives for legacy shipments is his opinion regarding the change in the economic environment during class period and his so-called legacy decomposition analysis. See supra at 50-58. Dr. Rausser maintains that legacy shippers would have been harmed by the alleged conspiracy because in the but-for world they would have been able to renegotiate their contracts and obtain waivers from their fuel surcharges. Rausser Supp. Rep. at 5. Dr. Kalt objects to Dr. Rausser's legacy shippers opinion because Dr. Rausser cannot explain the high "level of waivers in the but-for world [that] would be needed to explain the legacy damages." Class Certification Hr'g Tr. (Sept. 29, 2016) at 837. Specifically, Dr. Kalt calculated that defendants in the but-for world would have needed to waive or discount 75.5% of fuel surcharges to explain the overcharges that Dr. Rausser's model produces when applied to legacy shipments. Kalt Class Rep. ¶ 114 & Figure 23. Dr. Kalt contends that such a but-for world is unrealistic because, during the pre-class period, NS's "collection rate" transaction data indicates that defendants only discounted or waived approximately 2.9% of fuel surcharges. Id. ¶ 111 & Figure 22.

The Court finds that Dr. Kalt's work regarding legacy shippers and their ability to obtain waivers in the but-for world relevant and reliable for the purposes of Rule 702 and Daubert. Dr. Kalt's work is based on available transaction data from one of the defendants, NS. Plaintiffs have made no argument as to why this data is insufficient or how Dr. Kalt's methods are unsound. To the extent that plaintiffs and Dr. Rausser assert that Dr. Kalt's work is inconsistent with the factual record, those arguments do not challenge the reliability of Dr. Kalt's

methods but go to the weight to afford Dr. Kalt's opinion under Rule 23(b)(3). See Robinson v. District of Columbia, 75 F. Supp. 3d at 200.

c. Rates Equal to Variable Costs

Dr. Kalt next undertook an exercise in which he modified Dr. Rausser's damages model to set all-in rates equal to defendants' variable costs — i.e., "run[ning] the model as if rates never got higher than variable costs" — and he again found "false positives." Kalt Class Rep. ¶¶ 61-64; see also id., App. C, Figure C.II.4 (testing Dr. Rausser's damages model before the addition of the STB data); Class Certification Hr'g Tr. (Sept. 29, 2016) at 849-50. According to Dr. Kalt, when shippers pay all-in rates that are no higher than defendants' variable costs, "[t]here's no claim that such pricing at variable costs would generate overcharges" because defendants would only be recovering their shipping costs, including fuel, and no more. Class Certification Hr'g Tr. (Sept. 29, 2016) at 849. In this exercise, Dr. Kalt found "positive weekly overcharges for more than 33% of shipments when rates just equal costs," which is a counterintuitive result because defendants should not be collecting overcharges if they are simply recovering their variable costs. See Kalt Class Rep. ¶ 63 & Figure 11. The conclusion Dr. Kalt draws from this exercise is that Dr. Rausser's model "has this characteristic of converting rising fuel prices . . . into damages." Class Certification Hr'g Tr. (Sept. 29, 2016) at 851.

Plaintiffs move to exclude Dr. Kalt's false positives exercise setting rates equal to variable costs under Daubert because it improperly assumes that "railroads always price above cost" when in reality they "price to market." See Kalt Daubert Mot. at 20-21.[21] Class

[21] Plaintiffs do not explain these terms. Nonetheless, the Court understands that "pricing above cost" refers to a strategy where a railroad would take its variable costs, add a certain profit margin, and then set its price at that level. The Court also understands that "pricing

Certification Hr'g Tr. (Sept. 28, 2016) at 519-20. They claim that Dr. Kalt tested Dr. Rausser's model for something that Dr. Rausser never intended. But as defendants point out, the purpose of Dr. Kalt's exercise is to create a counterfactual "test of hypothetical pricing free of any possible overcharge," and the "equations and specifications" in Dr. Kalt's exercise "remain exactly as constructed by Dr. Rausser." Kalt Daubert Opp. at 32. The Court therefore denies plaintiffs' request to exclude Dr. Kalt's false positives exercise setting rates equal to variable costs under Daubert and Rule 702.

d. Pre-Class Period Fuel Surcharges

Next Dr. Kalt applied fuel surcharge formulas negotiated during the non-conspiratorial pre-class period to local carload traffic during the class period — but not to interline or intermodal traffic — and found that those pre-conspiracy fuel surcharges "would have generated more than $133 million more in FSC payments by Class Members than those Class Members' actual FSC payments." Kalt Class Rep. ¶ 39 & Figure 3; see also id. ¶ 100 & Figure 19. From this, Dr. Kalt concludes that the "earning power of the purportedly conspiratorial [fuel surcharge] provisions was less than the earning power of the published pre-'conspiracy' provisions." Id. ¶ 100. Plaintiffs do not explicitly challenge this exercise on Daubert grounds. Dr. Rausser contends, however, that Dr. Kalt cherry-picked data by applying a pre-class period fuel surcharge formula not reflective of "all carload shipments" or "not the[] main" formula. See Rausser Supp. Reply at 31-32. Plaintiffs' criticism is essentially that Dr. Kalt selectively mined data from Dr. Rausser's damages model — choosing local carload traffic to the exclusion of all other class period transaction data — to create his pre-class period

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to market" refers to a strategy where a railroad would take its variable costs and look to the prices set by its competitors as a means of setting as high a price as the market will bear.

fuel surcharge false positives exercise. Dr. Kalt explained that Dr. Rausser's "[d]ata do not permit comparable analyses for interline and intermodal traffic," a claim plaintiffs do not challenge. Kalt Class Rep. ¶ 99 n.143.

The technique of testing pieces of data in a larger regression is common in the field of econometrics. See In re Pool Prod. Distribution Mkt. Antitrust Litig., MDL No. 2328, 2016 WL 2756437, at *7 (E.D. La. May 12, 2016) ("Econometrics literature and antitrust case law support [the] use of sub-regressions to test the results of Dr. Rausser's regression models."), appeal dismissed (Oct. 27, 2016). "[T]esting [an econometrician's] own hypothesis using a finer lens in order to determine whether his results held true across the class . . . provide[s] a way for the defendants to illustrate their central argument that the plaintiffs' case-in-chief overlooks significant intra-class variation." In re Air Cargo Shipping Servs. Antitrust Litig., No. 06-MD-1175, 2014 WL 7882100, at *16-17 (E.D.N.Y. Oct. 15, 2014), adopted by 2015 WL 5093503, at *1 (E.D.N.Y. July 10, 2015). Because Dr. Kalt has "provided explanations for his methodological decisions that appear reasonable and grounded in econometrics literature[,] . . . defendants have met their burden of demonstrating that [his] analysis is sufficiently reliable to be admitted." See In re Vitamin C Antitrust Litig., 2012 WL 6675117, at *8. To the extent that plaintiffs' data-mining charge reveals "gaps" in Dr. Kalt's work, those implicate the weight to be given to his expert opinion, not its admissibility. See Campbell ex rel. Campbell v. Metro. Prop. & Cas. Ins. Co., 239 F.3d 179, 186 (2d Cir. 2001) (stating that where there are "gaps or inconsistencies" in an expert's opinion, "such arguments go to the weight of the evidence"). The Court finds Dr. Kalt's pre-class period fuel surcharge false positives exercise is reliable under Daubert and Rule 702 despite the narrow slice of the data on which Dr. Kalt based it.

3. Structural Break Analysis

Dr. Kalt conducted a "structural break analysis," wherein he ran statistical exercises to determine whether Dr. Rausser's model could "reliably detect the onset of [the] conspiracy." Class Certification Hr'g Tr. (Sept. 29, 2016) at 842. The goal of the exercises was to test Dr. Rausser's structural break hypothesis that, "if there's not another intervening event besides conspiracy, we can interpret a break [in the data] as being the result of conspiracy." Id. at 844. Dr. Kalt first conducted a structural break regression analysis of the full pre-class and class period data (2000-2008), and then conducted a structural break regression analysis of only the pre-class period data (2000-2003). Kalt Class Rep. ¶¶ 40-42.

Two novel terms related to Dr. Kalt's structural break exercises require explanation before proceeding. Dr. Kalt uses the terms "pseudo class period" and "pseudo pre-class period" to refer to the revised periods that, under his structural break exercise, occur when one changes the date from where Dr. Rausser found for a structural break — at the onset of the alleged conspiracy — to another date. The "pseudo pre-class period" is the period before the revised alleged conspiracy start date and the "pseudo class period" is the period after the revised alleged conspiracy start date. Dr. Kalt and others also refer to the "pseudo pre-class period" as the "pseudo benchmark period."

Dr. Kalt's full structural break analysis spanned 2000 to 2008 and found that "[t]he STB Model . . . finds statistically significant structural breaks and large overcharges every January and July between 2001 and 2007." Kalt Class Rep. ¶ 40. Dr. Kalt's second structural break analysis focused only on the pre-class period and found that structural breaks occurred each quarter from April 2000 to January 2003. Id. ¶¶ 41-42 & Figure 5; see also Kalt Class Sur-Reply ¶ 44 n.83. Dr. Kalt considers these "ubiquitous structural breaks" to be "themselves

false positives," Kalt Class Rep. ¶ 9, because the damages "model is always finding structural breaks and evidence of overcharges, even in a period where nothing in the case or in the claims says we should find overcharges and structural breaks." Class Certification Hr'g Tr. (Sept. 29, 2016) at 843. Dr. Kalt argues that the prevalence of structural breaks in Dr. Rausser's damages model — which both of his structural break analyses demonstrate — stems from the fact that Dr. Rausser's damages model uses as a benchmark all pre-class period transactions regardless of whether they include a fuel surcharge, but "his test period" or class period "is limited to transactions with an FSC." Kalt Class Rep. ¶ 42 n.65; see also Class Certification Hr'g Tr. (Sept. 29, 2016) at 845. As Dr. Kalt puts it, "the mis-matching of data effectively guarantees that average all-in rates in the test period will be higher than rates in the benchmark period." Kalt Class Sur-Reply ¶ 44 n.83.

From his structural break analysis, Dr. Kalt draws the conclusion that Dr. Rausser's model "doesn't have the ability to distinguish the vintaging effect from the alleged onset of conspiracy." Class Certification Hr'g Tr. (Sept. 29, 2016) at 848-49. By "vintaging," Dr. Kalt simply means changing the date one chooses to separate the pseudo benchmark period from the pseudo class period. Id. at 845, 848-49. Dr. Kalt suggests that "vintaging" is important because the prevalence of fuel surcharges in pre-class period contracts increased during the pre-class period leading up to Dr. Rausser's alleged July 2003 structural break. Kalt Class Sur-Reply ¶ 44 & n.83. Dr. Kalt found structural breaks at every date he tested earlier than July 2003 because, by testing an earlier benchmark, Dr. Kalt in effect shifted those pre-class period transactions with increasing fuel surcharge coverage into the pseudo class period, leaving the pseudo benchmark period with a small percentage of transactions with a fuel surcharge. See id.; see also Kalt Class Rep., Figure 21 (showing an increase in adoption of fuel surcharge coverage

in 2002-2003). In Dr. Kalt's view, Dr. Rausser's model therefore arbitrarily ascribes the July 2003 structural break to the conspiracy when Dr. Rausser's data construction — increasing or decreasing the vintaging effect — actually caused the break. Kalt Class Rep. ¶¶ 41-42 & Figure 5.

Plaintiffs move to exclude Dr. Kalt's pre-class structural break analysis on Daubert grounds because Dr. Kalt's "work papers" show that he "makes the nonsensical finding that as fuel costs rose in the pre-class period, all-in freight rates actually decreased." Kalt Daubert Mot. at 20. In other words, plaintiffs attack Dr. Kalt's results from the pre-class structural break analysis by claiming that the coefficient for Dr. Kalt's "diesel price interaction variable" has the wrong sign (i.e., negative) because the coefficient implies that as fuel costs increase, all-in rates decrease, which runs contrary to basic economic principles. See Rausser Supp. Reply at 90-91; McClave Supp. Rep. at 9. Plaintiffs conclude that this negative sign is indicative of unreliable work by Dr. Kalt that the Court should exclude under Daubert. See Kalt Daubert Mot. at 20.

The Court understands that an inexplicable or unexpected coefficient can act as a canary in the coal mine that indicates that a regression model — although perhaps facially reliable — is producing counterintuitive results inconsistent with real-world behavior. But here "[t]he Court is not persuaded that the variable's negative coefficient deems" Dr. Kalt's pre-class structural break analysis "so unreliable . . . that it fails Daubert's reliability prong," because Dr. Kalt "provides [a] plausible explanation[] as to why the negative coefficient is not necessarily an unexpected outcome." In re High-Tech Emp. Antitrust Litig., 2014 WL 1351040,

at *21.[22] He explains that the negative coefficient exists only with respect to Dr. Rausser's latest damages model that uses the STB data, not his previous damages model without that data. Kalt Class Sur-Reply ¶ 40; see also Kalt Class Rep., App. C, Figure C.I.5. If the negative coefficient reflects anything, Dr. Kalt argues, it is that Dr. Rausser's latest damages model — which includes the STB data — is unreliable. Kalt Class Sur-Reply ¶ 43. Dr. Kalt also adds that the negative variable — the diesel fuel indicator variable — must be considered in tandem with the class indicator variable because both variables capture the effect of the alleged conspiracy. Id. ¶¶ 41-42. When considering these two variables as a unit, Dr. Kalt opines that Dr. Rausser's damages model generates overcharges throughout the pre-class period. Id. ¶ 42.

"This Court need not decide whether Dr. [Kalt's] . . . explanations are in fact correct, as '[t]he evidentiary requirement of reliability [under Daubert] is lower than the merits standard of correctness.'" In re High-Tech Emp. Antitrust Litig., 2014 WL 1351040, at *21 (quoting In re Paoli R.R. Yard PCB Litig., 35 F.3d 717, 744 (3d Cir. 1994)); see also Primiano v. Cook, 598 F.3d 558, 564 (9th Cir. 2010) (internal citations omitted) ("[T]he test under Daubert is not the correctness of the expert's conclusions but the soundness of his methodology."). The Court therefore rejects plaintiffs' argument that the existence of a negative coefficient on the diesel price interaction variable means that Dr. Kalt's pre-class structural break analysis is so unreliable as to warrant its exclusion under Daubert and Rule 702. The Court will decide what

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[22] The Court is aware that a "plausible" theory of common proof is no longer sufficient to satisfy the Rule 23(b)(3) predominance requirement for class certification after Comcast. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 255; see also infra at 107-08. The Court uses the term here for Daubert and not Rule 23(b)(3) purposes, namely to explain that an expert witness — faced with an accusation that he excluded data or his results contain a negative sign — must provide a plausible response in order for his or her expert opinion to be considered reliable under Daubert and Rule 702.

weight to afford Dr. Kalt's pre-class structural break analysis, given the negative sign on a significant variable, under Rule 23.

4. Ordinary Fuel Cost Recovery

Plaintiffs next move to exclude Dr. Kalt's expert opinions related to defendants' ordinary fuel cost recovery on Daubert grounds, arguing that because Dr. Kalt "ignores significant [record] evidence of fuel cost over-recovery," meaning that defendants passed through more than just increased fuel costs to shippers during the class period. See Kalt Daubert Mot. at 16-18.[23] This argument is not that Dr. Kalt's methodology is unreliable and therefore is not based on Daubert. Even if plaintiffs are correct that the factual record is at odds with Dr. Kalt's position on ordinary fuel cost recovery, "it is not proper for the Court to exclude expert testimony merely because the factual bases for an expert's opinion are weak." Boyar v. Korean Air Lines Co., 954 F. Supp. 4, 7 (D.D.C. 1996) (internal quotation marks and citation omitted). It is a matter to be addressed in the class certification determination stage and then, possibly, at trial. The Court therefore declines to exclude Dr. Kalt's expert opinion suggesting that Dr. Rausser's model turns ordinary fuel cost recovery into overcharges under Daubert and Rule 702.

5. Uninjured Class Members

Dr. Kalt's final critique of Dr. Rausser's damages model concerns how it "find[s] no or negative" overcharges — that is, a putative class member "actually paid lower rates, on a

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[23] The Court understands that fuel cost recovery refers to a defendant's ability to raise prices in response to increases in fuel prices, thereby recovering any profit margin that would have otherwise been lost to the increase in costs. This is accomplished by passing through the increased fuel costs to the shippers by raising the all-in rate through mechanisms such as a fuel surcharge.

net basis, on its class shipments than the damages model predicts that it would have paid in the but-for world." Kalt Class Rep. ¶ 14 & n.18 (emphasis in original). Dr. Kalt looked at raw transaction data in Dr. Rausser's model and found that: (1) 65.2% of shippers have at least one shipment with negative overcharges; (2) 36.0% of all class shipments have negative overcharges; (3) 28.3% of all shippers have net negative overcharges across all of their shipments; and (4) 16.7% of all shippers have negative overcharges across all of their shipments. Kalt Class Rep. ¶¶ 73-74 & Figure 13. The 36% of class shipments with negative overcharges represents $15.2 billion of class revenue. Id. ¶ 74. Dr. Kalt also removed the problematic STB data from Dr. Rausser's damages model and used a higher fuel coefficient of 0.222, causing the number of shippers with net negative overcharges to jump from 28.0% to 43.5%. Id. ¶ 75 & Figure 14. At the class certification hearing, Dr. Kalt emphasized that Dr. Rausser himself concedes that at least 20.8% of all class shipments have net negative overcharges and 12.7% of all shippers have only negative overcharges across all of their shipments. Class Certification Hr'g Tr. (Sept. 29, 2016) at 862; see also Rausser Supp. Reply, Table 19. Dr. Kalt concludes from these examples of negative overcharges that there cannot be common proof of damages. Kalt Class Rep. ¶ 70.

Plaintiffs move to exclude Dr. Kalt's exercises with respect to uninjured class members under Daubert, arguing that Judge Cote excluded a similar opinion offered by Dr. Kalt in In re Electronic Books Antitrust Litigation, 2014 WL 1282298, at *13. Kalt Daubert Mot. at 31. In In re Electronic Books Antitrust Litigation, Dr. Kalt argued that the plaintiffs' regression model found injury for "millions of transactions [that] occurred at prices below" the average "but-for prices." 2014 WL 1282298, at *13. Judge Cote concluded that Dr. Kalt's work was unreliable because his "test, which simply compares the actual transaction price (i.e., the actual collusive price) to the predicted (average) competitive price, would flag as a 'false positive' the

transaction where consumers received a 50% discount, since the actual price they paid ($12) is less than the average competitive price ($15)." Id.[24] Put differently, Judge Cote saw it as improper to label "uninjured" those plaintiffs who paid less than the but-for price calculated by the plaintiffs' regression model, but who nonetheless would have paid even less in the absence of the conspiracy. Unlike the situation confronted by Judge Cote in In re Electronic Books Antitrust Litigation, however, the intent of Dr. Rausser's regression model here was not to calculate "elevation in prices due to price collusion for each" individual sale or shipment. See 2014 WL 1282298, at *13; see also Rausser Supp. Reply at 47 (showing the output of Dr. Rausser's damages model is an average weekly overcharge). Rather, Dr. Rausser's damages model calculates an average weekly overcharge based on a class-wide average but-for price. It therefore is appropriate for Dr. Kalt to examine individual shipments at prices below Dr. Rausser's class-wide average but-for price. See Kalt Class Rep. ¶¶ 71-75. Dr. Kalt's exercise is built upon the same robust data as Dr. Rausser's damages model and identifies a substantial number of shipments with no injury from the alleged conspiracy. Dr. Kalt's uninjured class members exercise is sufficiently reliable under Daubert and Rule 702 to warrant admissibility. The Court will consider whether the number of uninjured class members defeats a showing of predominance under Rule 23(b). See infra at 182-200.

C. Dr. Jeffrey J. Leitzinger

The Court next considers plaintiffs' supplemental expert, Dr. Jeffrey J. Leitzinger, whom plaintiffs retained to analyze the reliability of Dr. Rausser's work after the discovery of Dr. Rausser's connection to Cascade Settlement Services and the potential for damage to

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[24] Judge Cote uses the term "false positive" here in the same way this Court uses the term "uninjured class members" in this Opinion.

Dr. Rausser's credibility. See generally Leitzinger Rep. Dr. Leitzinger completed one expert report in this case. He is an economist and Managing Director of Econ One Research, Inc., an economic research and consulting firm. Id. ¶ 1. He holds a B.A. in economics from Santa Clara University and an M.A. and a Ph.D. in economics from the University of California, Los Angeles. He has been retained as an expert in numerous antitrust class action cases and is experienced in the use of regression models. Id.; see also id., Ex. 1. Defendants stipulated to Dr. Leitzinger's qualifications as an expert in the fields of economics and econometrics. Class Certification Hr'g Tr. (Sept. 27, 2016) at 330. The Court therefore finds that Dr. Leitzinger is qualified as an expert in the fields of economics and econometrics under Rule 702 based on his education and experience.

The Court reads Dr. Leitzinger's expert opinion to address four topics of consequence and to have reached the following conclusions: (1) Dr. Rausser's research methodology, analysis, and model design were sound; (2) Dr. Rausser's 0.103 constant fuel coefficient is appropriately conservative due to "margin compression" and "fuel price hedging"; (3) Dr. Rausser's model is not rigged to produce damages because a "Box-Cox" sensitivity analysis shows fuel price elasticity estimates below 0.103; and (4) his own "fuel shares" exercise demonstrates that the annual variable fuel price elasticities never rose high enough to eliminate the overcharges generated by Dr. Rausser's damages model. The Court will determine the admissibility of each of Dr. Leitzinger's opinions under Daubert and Rule 702, considering, where appropriate, the opinions of defendants' experts, specifically Dr. Carlton.

At the outset, the Court notes that defendants devoted a large portion of their cross-examination of Dr. Leitzinger at the class certification hearing to discussing the exercises he did not perform. Class Certification Hr'g Tr. (Sept. 29, 2016) at 773-84. That testimony

made explicit what is implicit in Dr. Leitzinger's expert report: he did not conduct any independent testing of his own regarding false positives or structural breaks, id. at 773-77; did not create his own common factors or damages models; did not perform a relevant market analysis; and did not otherwise confirm Dr. Rausser's overcharge estimates for specific commodities, routes, etc. Id. at 777-84. The Court does not consider these challenges to be Daubert arguments because they do not call into question the reliability of the work that Dr. Leitzinger actually performed. The Court notes that it is perfectly appropriate for Dr. Leitzinger to rely upon and not replicate these aspects of Dr. Rausser's work in order to comment on them. "[T]here is no indication that the work was outside his expertise as an economist (in which field Dr. [Leitzinger] is clearly qualified) such that he could not understand it. Indeed, part of Dr. [Leitzinger's] opinion is that Dr. [Rausser's] analysis is consistent with economic theory." In re Urethane Antitrust Litig., 2012 WL 6681783, at *4. The Court therefore does not find Dr. Leitzinger unreliable under Daubert and Rule 702 based on the work he did not do.

1. Dr. Rausser's Research Methodology, Analysis, and Model Design

Dr. Leitzinger reviewed Dr. Rausser's reports, work papers, and deposition testimony and concluded that his work in this case "was reasonable and reliable" along five metrics of evaluation: (1) consistency with professional practice; (2) comprehensiveness of data; (3) reasonableness of research design; (4) proper and accurate analysis; and (5) adequacy of results to support conclusions. Leitzinger Rep. ¶¶ 3, 7, 10. Dr. Leitzinger found "no evidence of bias or deviation from sound economic principles in the manner in which [Dr. Rausser] designed his work, utilized the evidence, or drew his conclusions." Id. ¶ 10. Dr. Leitzinger confirmed Dr. Rausser's conclusion that the rail freight industry is susceptible to collusion with respect to a

common pricing scheme. Id. ¶ 12. At no point did Dr. Leitzinger's report stray into an independent review of the documentary record to opine on whether there was or was not collusion in this case, as Dr. Rausser did. See supra at 34-35, 37-38. Dr. Leitzinger merely collected scholarly and governmental support for Dr. Rausser's expert opinion that defendants' alleged conspiratorial conduct in this case is consistent with collusion and not with the behavior of self-interested competitors. Leitzinger Rep. ¶¶ 21-34. That is permissible expert opinion because "[a]n economic expert may permissibly testify as to whether certain conduct is consistent with collusion or an entity or individual's self-interest," In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 424, or "whether an industry's market structure makes it particularly susceptible to collusion." Id. at 421; see also In re Delta/Airtran Baggage Fee Antitrust Litig., No. 09-MD-2089, 2017 WL 1186416, at *10 (N.D. Ga. Mar. 28, 2017) (quoting In re Polypropylene Carpet Antitrust Litig., 93 F. Supp. 2d 1348, 1355 (N.D. Ga. 2000)) ("Courts in this circuit and others regularly admit expert testimony that certain conduct or evidence is 'consistent with a finding that Defendants engaged in a conspiracy to fix prices.'").[25]

Dr. Leitzinger also testified that Dr. Rausser created a testable hypothesis and generally affirmed Dr. Rausser's data construction in his common factors and damages models. Class Certification Hr'g Tr. (Sept. 28, 2016) at 681-85; see also Leitzinger Rep. ¶¶ 111-13. Dr. Leitzinger stated in his expert report that Dr. Rausser employed a regression model of the

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[25] As noted, the Court has excluded under Daubert several of Dr. Rausser's opinions that crossed the line from a statement that "defendants conduct is consistent with collusion" to "defendants colluded." See supra at 34-35, 37-38. Dr. Leitzinger restates some of Dr. Rausser's conclusions regarding defendants' actions. Leitzinger Rep. ¶¶ 16, 33, 91-100. The Court excluded Dr. Rausser's expert opinion that defendants intended to collude but not his opinion that defendants' behavior is consistent with collusion. See supra at 34-35, 37-38. Similarly, the Court excludes any of Dr. Leitzinger's opinions concerning defendants' intent, such as the factual issues of what defendants agreed to do in furtherance of an alleged conspiracy.

type often used and widely accepted in pricing analyses, Leitzinger Rep. ¶¶ 39-46, and that all of Dr. Rausser's work is free of bias and employs techniques deemed reliable in the econometric community. Id. ¶¶ 47-58. Dr. Leitzinger conducted an independent review of econometric literature to conclude that Dr. Rausser's use of a constant fuel coefficient "is widely used by economists" studying antitrust issues, id. ¶ 109, and "often the specification of choice for reduced form pricing models in antitrust matters," including numerous pending multidistrict litigation matters. Id. ¶ 111. Again, "arguments about which method is superior for use in this case" go to the weight of Dr. Leitzinger's opinions, not their admissibility. See In re Urethane Antitrust Litig., 2012 WL 6681783, at *7. The Court will admit Dr. Leitzinger's expert opinions supporting Dr. Rausser's research methodology, analysis, and model design as permissible expert opinion under Rule 702.

2. Constant Fuel Coefficient: Margin Compression and Fuel Price Hedging

Dr. Leitzinger offered several novel reasons to explain why Dr. Rausser's damages model is reliable, specifically with respect to his use of a 0.103 constant fuel coefficient. Dr. Leitzinger describes one such reason as "margin compression," an economic phenomenon that suggests that a constant fuel coefficient is a conservative assumption. Leitzinger Rep. ¶ 116.[26] Dr. Leitzinger explains that margin compression "occurs when railroads' shipping rates do not increase as rapidly as their costs," so defendants are increasingly unable to pass through increases in their fuel costs because "counteracting effects work in the direction of lower elasticities." Id. ¶¶ 119-20. The main counteracting effect in margin

[26] By "conservative," Dr. Leitzinger means that Dr. Rausser's choice of a constant fuel coefficient underestimates (relative to a variable fuel coefficient) the relationship between changes in fuel prices and changes in all-in rates that he models.

compression is the rational tendency of "a profit-maximizing firm" in an oligopoly (a market with few competing firms) to "choose not to raise price[s] by the full amount of the [fuel] cost increase, accepting compression of its price margin . . . in exchange for the ability to retain more sales." Id. ¶ 121 & Figure 1. Dr. Leitzinger compiled record evidence showing that defendants' conduct during the class period was consistent with margin compression and less than complete pass through. Id. ¶¶ 122-23. According to Dr. Leitzinger, margin compression rebuts Dr. Kalt's exercises showing false positives because those exercises assume artificially high but-for prices (based on 100% pass through and no margin compression). Id. ¶¶ 156-59. In practice, a less-than-complete pass-through rate would lower the but-for price and thereby transform some of Dr. Kalt's supposed false positives into results that are "fully consistent with a properly functioning pricing model." Id. ¶ 156.

Dr. Leitzinger also cites "fuel price hedging" as a reason why Dr. Rausser's constant fuel elasticity assumption is conservative. Leitzinger Rep. ¶¶ 34, 125 n.270. Fuel price hedging is a common business practice that allows defendants "to insulate their fuel costs from higher fuel prices," such that "the dollar-for-dollar impact of increased fuel prices on fuel costs would decline as fuel prices rise" and "reduce the shipping rate-to-fuel price elasticity." Id. ¶ 125. Dr. Leitzinger reviewed Dr. Rausser's expert opinion on defendants' hedging strategies, finding that those strategies most often focused on obtaining "lower fuel costs" by agreeing to purchase fuel at a fixed price far in advance, in order to protect themselves from future price volatility. Id. ¶ 34 & n.88. Dr. Leitzinger also cites margin compression and hedging as reasons to doubt the large annual variable fuel coefficients, ranging as high as 0.3, which Dr. Kalt calculated during the class period. Id. ¶¶ 119, 124-25.

Dr. Carlton responds to Dr. Leitzinger's margin compression argument by stating that it contradicts Dr. Rausser's model construction, which assumes 100% pass through — complete fuel cost recovery — in the but-for world. Carlton Rep. ¶ 62. But that is precisely the point of margin compression, which in simple terms suggests that sellers in an oligopolistic market will absorb price increases on inputs if it allows them to retain market share. Leitzinger Rep. ¶ 121 & Figure 1. Indeed, Dr. Leitzinger testified at the class certification that the pass-through rate would likely have been closer to 80%. Class Certification Hr'g Tr. (Sept. 29, 2016) at 803. This supposed contradiction does not undermine the reliability of Dr. Leitzinger's margin compression hypothesis because Dr. Rausser assumed 100% pass through for defendants' benefit, i.e., to remove any argument that his model did not permit fuel cost recovery. Dr. Leitzinger's margin compression finding that the actual pass-through rate is closer to 80% is support for his argument that Dr. Rausser's 100% figure is conservative, and therefore that Dr. Rausser's damages model is not rigged to find damages.

Dr. Carlton also argues that Dr. Leitzinger "presents no quantitative estimate" of how the forces of margin compression "exist[] in [Dr.] Rausser's model" or how much they would change Dr. Rausser's calculations of the fuel surcharge rates in the but-for world. Carlton Rep. ¶ 62. The Court finds that Dr. Leitzinger's margin compression and hedging hypotheses are reliable under Daubert because, although they are "to some extent an approximation," Dr. Leitzinger cited appropriate econometric authority for them and sufficiently explained their application in this case. See In re BankAtlantic Bancorp, Inc. Sec. Litig., No. 07-61542, 2010 WL 6397500, at *17 (S.D. Fla. Aug. 18, 2010) (finding arguments concerning margin compression admissible under Daubert). The dispute between Dr. Leitzinger and Dr. Carlton as to whether Dr. Leitzinger's margin compression and hedging hypotheses support or undermine

Dr. Rausser's damages model goes to weight, not admissibility. The Court therefore concludes that Dr. Leitzinger's margin compression and hedging analyses are admissible under Daubert and Rule 702.

3. Constant Fuel Coefficient: Box-Cox Sensitivity Analysis

Dr. Leitzinger defends "Dr. Rausser's choice to use a constant fuel coefficient" by employing a "Box-Cox sensitivity analysis" to prove that the use of a constant fuel coefficient was not "the reason that the model was triggering overcharges." Class Certification Hr'g Tr. (Sept. 28, 2016) at 698. Dr. Leitzinger explained that a Box-Cox sensitivity analysis is a "test [of] whether the overcharges identified by Dr. Rausser were simply the product of a model specification that failed to allow for variable elasticities." Leitzinger Rep. ¶ 137. He emphasized that "Box-Cox is a widely employed econometric technique for estimating regression parameters that vary in some systematic fashion over time." Id. The Court understands the Box-Cox method, at base, to allow the transaction data in Dr. Rausser's model to speak for itself, i.e., if there are "changing elasticities" over time "then this Box-Cox sensitivity analysis . . . allows the data to dictate the extent of such variability." Id. ¶ 139. Dr. Leitzinger found that, "[o]ver the eight-year sample period, the resulting monthly elasticity estimates ranged from 0.069 to 0.093, with a mean of .080." Id. ¶ 137 & Figure 3. Those elasticities are "very limited" in "variability" and much lower than the variable elasticities Dr. Kalt calculated. Class Certification Hr'g Tr. (Sept. 28, 2016) at 699-700. They are also lower than Dr. Rausser's 0.103 fuel price elasticity. Id. Plugging those monthly elasticities into Dr. Rausser's model, Dr. Leitzinger found "statistically significant overcharges on the order of six percent," which, he argues, confirms that Dr. Rausser's constant fuel coefficient is not rigged to produce damages. Leitzinger Rep. ¶ 138.

Dr. Carlton concedes that Dr. Leitzinger's Box-Cox sensitivity analysis "can be used to test whether [Dr.] Rausser's log-log specification is consistent with the data." Carlton Rep. ¶ 57. But Dr. Carlton nevertheless argues that Dr. Leitzinger's Box-Cox sensitivity analysis is not reliable because Dr. Leitzinger committed a computational error that "reverses the direction in which the estimated fuel price elasticities trend over time." Id. ¶ 59 & Figure 7 (emphasis in original). In response to Dr. Carlton's critique, Dr. Leitzinger corrected the computational error. Id. ¶ 59; see also Class Certification Hr'g Tr. (Sept. 28, 2016) at 701. As corrected, however, Dr. Carlton claims that Dr. Leitzinger's Box-Cox estimated fuel price elasticities "trend downward over time even though fuel prices were rising," which is a counterintuitive conclusion that increases in fuel price cause decreases in elasticity. Dr. Carlton says this is "a nonsensical pattern" contrary to Dr. Leitzinger's own fuel shares exercise and a result Dr. Leitzinger admits is "unexpected." Carlton Rep. ¶¶ 60, 95. The Court need not decide which expert is correct under Daubert or Rule 702. See In re High-Tech Emp. Antitrust Litig., 2014 WL 1351050, at *21. A court "may admit even somewhat questionable testimony if it falls within the range of where experts might reasonably differ, and where the [fact-finder] must decide among the conflicting views." Id. (internal quotation marks and citation omitted). The Court therefore finds that Dr. Leitzinger's Box-Cox sensitivity analysis is reliable under Daubert and therefore admissible.

4. Annual Fuel Shares

Dr. Leitzinger also "performed a sensitivity analysis to determine how high the variable cost-to-fuel price elasticity would have to be in order to eliminate overcharges" assuming 100% pass through. Leitzinger Rep. ¶ 126. Dr. Carlton refers to this as Dr. Leitzinger's "annual fuel shares" data, see Carlton Rep. ¶ 15, and the Court will also use that

phrase. Dr. Leitzinger testified to the following definition of his fuel shares work at the class certification hearing:

> A fuel-price share is basically if you take the amount of variable cost on a per-ton-mile basis and you also take the fuel price and the fuel usage per-ton mile and multiply those two together so that you can get, based on the published fuel price, an effective fuel use, you take the ratio of those two things. So that would tell you, in effect, if all the fuel that was used were paid for at the fuel price, what would its share of variable cost be.

Class Certification Hr'g Tr. (Sept. 28, 2016) at 715. In other words, Dr. Leitzinger's annual fuel shares exercise assumes that "[e]ven if . . . higher fuel prices translate dollar-for-dollar into higher railroad fuel costs (an unlikely result given the railroads' fuel price hedging programs and purchasing arrangements), the variable cost-to-fuel price elasticity would equal the ratio of the fuel price (on a fuel use-per-ton mile basis) to the railroads' variable costs per ton-mile." Leitzinger Rep. ¶ 127.

Dr. Leitzinger initially calculated the annual fuel share ratios for 1999 to 2008 and found that elasticities increased from 0.152 in 1999 to 0.317 in 2008. Leitzinger Rep. ¶ 127 & Figure 2. Dr. Leitzinger later revised these figures on the eve of his deposition to better match Dr. Rausser's methodology, an approach Dr. Carlton disputes. Carlton Rep. ¶¶ 35-36 & nn.57-58; see also Class Certification Hr'g Tr. (Sept. 28, 2016) at 790-91. Dr. Leitzinger's revised annual fuel shares range from 0.151 to 0.181, a smaller ratio than he initially calculated, but still greater than Dr. Rausser's 0.103 fuel price elasticity. Carlton Rep. ¶¶ 36-37 & Tables 3, 4. In contrast, Dr. Leitzinger's exercise "found that the variable cost-to-fuel price elasticity over the [class] period would have to be approximately 0.3 (or higher) to eliminate overcharges." Leitzinger Rep. ¶ 126. The implication of Dr. Leitzinger's fuel shares exercise, then, is that annual elasticities "[n]ever rose high enough to effectively eliminate the overcharges calculated

by Dr. Rausser." Class Certification Hr'g Tr. (Sept. 28, 2016) at 716. As such, Dr. Leitzinger concludes that Dr. Rausser's model is not "rigged" to produce damages, as defendants suggest, and properly detects overcharges. Leitzinger Rep. ¶ 128.

Although Dr. Carlton undertakes independent exercises to rebut Dr. Leitzinger's annual fuel shares, he does not dispute that Dr. Leitzinger's fuel shares analysis is a reliable method of testing Dr. Rausser's 0.103 constant fuel elasticity in this case because, he asserts, "the fuel price elasticity should equal the fuel share." Carlton Rep. ¶ 6. Dr. Carlton even admitted that "the fuel shares calculated from the railroad's data provide an independent measure of the fuel price elasticity but-for the conspiracy; thus we can test the reasonableness of [Dr.] Rausser's estimated constant non-conspiratorial fuel price elasticity by comparing it to the fuel shares." Id. ¶ 23. Dr. Leitzinger's fuel shares exercise is a reliable econometric tool for testing the accuracy of Dr. Rausser's constant fuel coefficient and therefore is admissible under Daubert and Rule 702. Dr. Carlton's argument that Dr. Leitzinger's annual fuel shares exercise suggests that Dr. Rausser's 0.103 constant fuel coefficient is unreasonably low goes to the weight of the evidence and not to its admissibility.

D. Dr. Dennis W. Carlton

Dr. Dennis W. Carlton completed one expert report in this case. See generally Carlton Rep. Dr. Carlton is the David McDaniel Keller Professor of Economics at the Booth School of Business at the University of Chicago, where his research focuses on industrial organization and theoretical and applied microeconomics. Id., Ex. 1 at 1. He also serves as a Senior Managing Director of Compass Lexecon, an economic consulting firm. Carlton Rep. ¶ 3. He received his A.B. in applied mathematics and economics from Harvard University and an M.S. in operations research and a Ph.D. in economics from the Massachusetts Institute of

Technology. Id. ¶ 1. Dr. Carlton has previously held positions as the Deputy Assistant Attorney General for Economic Analysis in the Antitrust Division of the United States Department of Justice, as a Commissioner of Congress' Antitrust Modernization Commission, and as a consultant to federal agencies on the development of horizontal merger guidelines. Id. ¶ 2. Plaintiffs stipulated to Dr. Carlton's qualifications as an expert in the fields of economics and econometrics under Rule 702. Class Certification Hr'g Tr. (Sept. 27, 2016) at 330-31. The Court therefore finds that Dr. Carlton is qualified as an expert in the fields of economics and econometrics based on his education and experience.

The Court reads Dr. Carlton's expert opinion as containing four principal arguments: (1) Dr. Leitzinger's Box-Cox sensitivity analysis and margin compression opinion (already discussed with respect to Dr. Leitzinger) are unreliable; (2) Dr. Rausser's use of a constant fuel coefficient does not allow for ordinary fuel cost recovery, as indicated by "implausibly low" fuel pass-through rates; (3) Dr. Leitzinger's revised fuel shares disprove the reliability of Dr. Rausser's model due to "Shephard's Lemma"; (4) Dr. Rausser's model generates false positives when setting rates based on the rail cost adjustment factor ("RCAF") escalation index; and (5) Dr. Rausser's damages model demonstrates that many of the largest shippers are uninjured. The Court will determine the admissibility of each of Dr. Carlton's opinions under Daubert and Rule 702.

1. Issues Already Discussed

The Court already has detailed some of Dr. Carlton's opinions concerning Dr. Leitzinger's work, including his concerns with Dr. Leitzinger's margin compression hypothesis and Box-Cox sensitivity analysis. See supra at 84-88. For the most part, the Court need not separately analyze those opinions under Daubert. The Court finds that Dr. Carlton's

analysis disputing Dr. Leitzinger's work on these subjects is reliable; it does not relay original econometric work but rather reflects methodological criticism stemming from Dr. Carlton's experience as an econometrician and an economist. Such matters are squarely within his expertise.

2. Constant Fuel Coefficient: Fuel Pass-Through Rates

Dr. Carlton calculated year-over-year fuel pass-through rates in order to determine whether Dr. Rausser's model reflected observable real-world conditions. Carlton Rep. ¶¶ 43-44 & Table 6. Dr. Carlton undertook this exercise in order to "demonstrate[] that [Dr.] Rausser's model allows pass-through rates (but-for the conspiracy) that are implausibly low when fuel costs are high," and that "[t]he low pass-through rates implied by [Dr.] Rausser's model are another consequence of his constant fuel price elasticity assumption." Id. ¶ 44. When performing an annualized calculation of pass-through rates under Dr. Rausser's model, Dr. Carlton finds pass-through rates of 39% in 2006, 15% in 2007, and 50% in 2008 — the final years of the alleged conspiracy, when diesel prices had skyrocketed. Id. ¶¶ 43-44 & Table 6. From these exercises, Dr. Carlton concludes that Dr. Rausser's use of a constant fuel coefficient is unreliable. Id. ¶ 44.

Dr. Leitzinger disputes Dr. Carlton's calculations as based on too narrow a time period as to be reliable. Class Certification Hr'g Tr. (Sept. 28, 2016) at 707-08. At the class certification hearing, Dr. Leitzinger testified that Dr. Carlton's pass-through calculations "are not comparisons of the Class Period to the pre-Class Period, but comparisons of one year within the Class Period to another year within the Class Period. 2005 looks back at 2004. 2006 looks at 2005, et cetera." Id. Regardless of whether a narrow (year-over-year) or broad (pre-class period vs. class period) timeframe is the most appropriate metric for calculating fuel cost pass through,

the Court finds that Dr. Carlton's yearly calculations are each built upon thousands of transactions such that they are reliable for the purposes of Daubert and Rule 702. The Court will assess the weight to afford Dr. Carlton's yearly pass-through calculations in light of Dr. Leitzinger's critiques under Rule 23. See In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 434.

3. Fuel Shares and Shephard's Lemma

Dr. Carlton does not dispute Dr. Leitzinger's fuel shares exercise, Carlton Rep. ¶¶ 23-25, which "determine[s] how high the variable cost-to-fuel price elasticity would have to be in order to eliminate overcharges" assuming 100% pass through. Leitzinger Rep. ¶ 126. Dr. Carlton asserts that "fuel price elasticity can be treated as being approximately equal to fuel share of variable cost," so it can "provide an independent measure of the fuel price elasticity but-for the conspiracy . . . [to] test the reasonableness of [Dr.] Rausser's estimated constant non-conspiratorial fuel price elasticity." Carlton Rep. ¶ 23. Dr. Carlton suggests that "fuel price elasticity is related to the railroads' share of variable cost according to a well-known result in economics known as Shephard's Lemma." Id.; see also Class Certification Hr'g Tr. (Sept. 30, 2016) at 1042-43. In other words, Dr. Rausser's "fuel price elasticity can be shown to be approximately equal to the share of fuel in a railroad's variable costs (the 'fuel share')." Carlton Rep. ¶ 6.

Based on the theory of Shephard's Lemma, Dr. Carlton states that running Dr. Rausser's model using Dr. Leitzinger's initial annual fuel shares — not the revised figures he produced on the eve of his deposition — causes average overcharges to drop to -26.2%. Carlton Rep. ¶ 30 & n.49. Dr. Carlton also suggests that even if Dr. Leitzinger's revised fuel shares are correct, when plugging them into Dr. Rausser's model, they reduce the estimated monthly

overcharge from 9.8% to 3.2%, a 66% reduction in overcharges. Id. ¶ 38 & Table 5. Dr. Carlton also asserts that both of these exercises demonstrate that Dr. Leitzinger's annual fuel shares results "contradict the assumption [Dr.] Rausser imposed on his model, that the fuel price elasticity must be constant," because Dr. Leitzinger's annual fuel shares calculation is always above Dr. Rausser's 0.103 constant fuel elasticity. Carlton Rep. ¶ 25 & Table 1.

Dr. Leitzinger testified that it is inappropriate to assume that fuel shares would equal fuel price elasticity because the railroads engage in hedging strategies so fuel prices do not necessarily reflect the railroad's actual fuel costs. See Class Certification Hr'g Tr. (Sept. 28, 2016) at 717; see supra at 85-86. Dr. Rausser also responded to Dr. Carlton's Shephard's Lemma argument by contending that "[t]here's not a shred of evidence" that railroads have ever satisfied the Shephard's Lemma assumption that "the railroads at every point in time are going to be at their long-run equilibrium with regard to the optimal amount of fuel and all other inputs that they're using." Class Certification Hr'g Tr. (Sept. 27, 2016) at 392-93. Dr. Rausser also stated that no "empirical studies" have found that railroads are able to reach that "equilibrium"; rather, they suggest that "fuel shares are often three or more times higher than the variable cost fuel price elasticity." Id. at 393. Dr. Carlton argues in response that "[e]ach one of the studies" on which Dr. Rausser relies also uses "Shephard's Lemma when they're estimating their cost functions." Class Certification Hr'g Tr. (Sept. 30, 2016) at 1037.

Plaintiffs' experts and Dr. Carlton essentially dispute whether Shephard's Lemma — the assumption upon which Dr. Carlton's fuel shares exercise is based — is applicable to this case. While it is true that at least four of the studies on which Dr. Rausser relies in his reports rely upon Shephard's Lemma as part of their proof, see Defs. Ex. 4 at 10-14, none addresses Dr. Rausser's concern that Shephard's Lemma was unobtainable by defendants in this case. For

the purposes of Daubert and Rule 702, Dr. Carlton has sufficiently explained that Shephard's Lemma and his related fuel shares work is relevant to the facts of this case based on independent literature. See id.; see also In re Elec. Books Antitrust Litig., 2014 WL 1282298, at *4 (noting that a court should exclude expert testimony only if it is "based on assumptions that are so unrealistic and contradictory as to suggest bad faith" and that "[o]ther contentions that the assumptions are unfounded go to the weight, not the admissibility, of the testimony"). The Court will examine Dr. Carlton's opinion and the competing views of plaintiffs' experts under Rule 23. Id.

4. RCAF False Positives

Next, Dr. Carlton "test[ed] whether rail rates based on RCAF result in false positives" because "[p]laintiffs have suggested in this proceeding that rate adjustments based on RCAF had been used for decades and were not conspiratorial." Carlton Rep. ¶¶ 68, 72. RCAF refers to the Rail Cost Adjustment Factor, an index of rail costs approved by the STB that "provides a mechanism by which rates in a rail freight price authority can be adjusted to reflect changes in rail operating costs." Id. ¶ 6 n.11. In fact, Dr. Rausser admitted that "RCAF would have been used" to set fuel surcharge rates "in the but-for world" and that RCAF permits "less than full recovery of fuel costs." Id. ¶¶ 72-73. To construct his RCAF exercise, Dr. Carlton "simulate[d] a series of rail rates in each quarter such that the change in the rail rate from quarter to quarter [was] determined entirely by the cost increases captured in the RCAF index." Id. ¶ 74. Dr. Carlton found that "the average rail rates based on RCAF-U generally exceed those but-for rail rates," which "means that [Dr.] Rausser's model will find damages even if a railroad had charged rates during the Class Period that were escalated using only non-conspiratorial

RCAF-U." Id. ¶ 75 & Figure 8. Dr. Carlton calculated an average overcharge of 0.8% using all-in rates based solely on RCAF-U fluctuations. Id. ¶ 76 & Table 7.

Plaintiffs responded to Dr. Carlton's RCAF work at the class certification hearing. First, plaintiffs point out that Dr. Kalt's Merits Report suggested that "RCAF was rarely used," Class Certification Hr'g Tr. (Sept. 26, 2016) at 101, and Dr. Carlton himself admitted on cross-examination that it "was not something widely used during the pre-class period." Class Certification Hr'g Tr. (Sept. 30, 2016) at 1097. Plaintiffs also distinguish between RCAF-U — the index with which Dr. Carlton found a 0.8% overcharge — and RCAF-A, an alternative fuel pricing index that adjusts for defendants' productivity such that "if a railroad has eight cars on a train and suddenly turns them into []double deckers, the RCAF A would" account for that. Id. at 1234. Dr. Carlton's regression found no overcharge when running Dr. Rausser's model on the RCAF-A index (-5.1%) and an average of RCAF-U and RCAF-A (-2.2%), which suggests no damages. Carlton Rep. ¶ 76 & Table 7. Plaintiffs claim that the only reason the RCAF-U index finds a 0.8% overcharge is because it makes "no adjustments for productivity" and thereby "inherently . . . lead[s] to over-recovery." Class Certification Hr'g Tr. (Sept. 30, 2016) at 1234.

The Court concludes that Dr. Carlton's RCAF false positives exercises would confuse rather than aid the fact-finder because it is unlikely that railroads would have used the RCAF-U index — standing alone — to set prices in the but-for world. See FED. R. EVID. 702(a). Dr. Carlton testified at the class certification hearing about "tension between shippers and railroads when they negotiate rates" based on either RCAF-U or RCAF-A. Class Certification Hr'g Tr. (Sept. 30, 2016) at 1104. The negotiation often results in some combination of RCAF-U and RCAF-A to set prices, and Dr. Carlton found no damages when averaging the two indices. Carlton Rep. ¶ 76 & Table 7. Dr. Carlton's one positive overcharge finding — the 0.8%

overcharge Dr. Carlton calculated using the RCAF-U index — may be nothing more than statistical noise reflecting the fact that RCAF-U does not account for shippers' productivity gains that allow them to ship the same amount of cargo with less fuel. See Class Certification Hr'g Tr. (Sept. 30, 2016) at 1234. Indeed, Dr. Carlton acknowledged that RCAF-U "can reflect a higher rate of cost increase than the costs that railroads actually experienced." Id. at 1101. For all of these reasons, the Court excludes Dr. Carlton's RCAF false positives exercises as unhelpful to the fact-finder under Daubert and Rule 702. See FED. R. EVID. 702(a).

5. Uninjured Large Shippers

Finally, Dr. Carlton identified the 200 largest shippers in the putative class by revenue. Carlton Rep. ¶ 87 & n.129. He ran Dr. Rausser's damages model to create "a separate estimate of damages for each" of those 200 "shipper[s] and thereby allow [Dr.] Rausser's damage estimate to vary by shipper." Id. ¶ 86. Dr. Carlton found that, "[o]f the 200 largest shippers" in the putative class, 25 shippers — accounting for $5.5 billion in class revenue — were uninjured, meaning that they have "statistically significant negative" overcharges. Id. ¶ 87. Dr. Carlton's exercise calculated average overcharges for those 200 shippers, meaning that he labels a shipper uninjured if it had negative overcharges in the aggregate across the entire class period. Id. ¶ 87 n.130. He substantiates these results by noting that his "regression uses millions of observations and even the smallest shipper" among the 200 largest shippers "with negative [overcharges] had $50 million in class shipments." Id. Notably, Dr. Carlton arrived at these results using Dr. Rausser's 0.103 constant fuel elasticity. Id. ¶ 88 & Table 8. As an additional data point, Dr. Carlton ran those 200 largest shippers through Dr. Rausser's model using Dr. Leitzinger's fuel shares data — which permits fuel elasticity to vary according to fuel share — and found negative overcharges for 57.5% of shippers. Id. Dr. Carlton concludes that his

own "finding that these corrections result in over half of shippers" having net negative overcharges during "the alleged conspiracy is further confirmation that [Dr.] Rausser's model, even with more accurate assumptions on elasticities, is unreliable for measuring alleged conspiratorial [overcharges]." Id. ¶ 89. The Court concludes that Dr. Carlton's uninjured large shipper exercise is reliable, and therefore admissible, for the same reasons that it found Dr. Kalt's uninjured class members exercise reliable: it is built upon the same robust data as Dr. Rausser's damages model and identifies a substantial number of shipments with no injury from the alleged conspiracy.

E. Dr. James T. McClave

Plaintiffs' second supplemental expert is Dr. James T. McClave, who completed two expert reports in this case. See generally McClave Merits Rep.; McClave Supp. Rep. Dr. McClave is the President and Chief Executive Officer of Info Tech, Inc., which provides consulting services associated with antitrust analysis. McClave Merits Rep. at 2-3. He holds a B.S. in physics from Bucknell University and a Ph.D. in statistics from the University of Florida, where he previously taught statistics and business for over 40 years. Id., App. A at 1. Dr. McClave has authored six textbooks on statistics and econometrics and consulted on more than 100 matters involving antitrust or competition. McClave Merits Rep. at 2. Defendants stipulated to Dr. McClave's qualifications as an expert in the fields of statistics and econometrics under Rule 702. Class Certification Hr'g Tr. (Sept. 27, 2016) at 330-31. The Court therefore finds that Dr. McClave is qualified as an expert in the fields of statistics and econometrics based on his education and experience.

The Court reads Dr. McClave's expert reports to include the following:

(1) criticism of Dr. Kalt's structural break analyses; and (2) creation of a "customer indicator variable" to test Dr. Rausser's model for uninjured class members.[27] The Court will determine the admissibility of each of Dr. McClave's expert opinions under Daubert and Rule 702, considering where appropriate the critiques of defendants' experts.

1. Dr. Kalt's Structural Break Analysis

Dr. McClave first ran an exercise to demonstrate that Dr. Kalt's structural break analysis "actually provide[s] further support for Dr. Rausser's opinion that his model provides economic evidence consistent with a conspiracy beginning in the first half of 2003." McClave Merits Rep. at 11-12 & Figure 1. When Dr. Kalt first ran his structural break analysis, it spanned both the pre-class period and the class period. Dr. McClave argued that Dr. Kalt's "pseudo pre-class period" in that first iteration actually included conspiratorial contracts from the class period that tainted its results. McClave Supp. Rep. at 7. Dr. Kalt then modified the first version of the exercise on remand after Dr. Rausser incorporated the STB data, id., and Dr. McClave found the same result: "the overcharges increase as Dr. Kalt includes more of the actual class period in his 'pseudo-class' period and decline when a substantial part of the class period is included in his 'pseudo-benchmark' period." Id. at 8.

Second, Dr. Kalt then conducted a structural break exercise, which was limited to testing for breaks each quarter during the pre-class period of January 2000 to March 2003. Kalt Class Rep. ¶¶ 41-42 & Figure 5; see also Kalt Class Sur-Reply ¶ 44 n.83. Dr. McClave argues that this exercise is data-mining because, "by eliminating basically six years of data[,] . . . you're asking for statistical trouble." Class Certification Hr'g Tr. (Sept. 28, 2016) at 605-06.

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[27] The first of these opinions is directed at the larger question of whether a constant or variable fuel coefficient is the best method for the damages model in this case.

Dr. McClave also found an unexpected negative sign in Dr. Kalt's work "that as fuel costs increased in the pre-class period, freight rates decreased — which does not make sense econometrically." McClave Supp. Rep. at 9. As noted, Dr. Kalt has provided a response to Dr. McClave's criticism about the negative sign in his results. See supra at 76-77.

Defendants' primary criticism of Dr. McClave is that he did not do more independent work to support Dr. Rausser's models. See Class Certification Hr'g Tr. (Sept. 28, 2016) at 661-62. But those arguments go to the weight of Dr. McClave's opinion, not to its admissibility. Dr. McClave's work is relevant to Dr. Kalt's structural break analyses and whether the damages model reliably detects a structural break and overcharges. The fact that Dr. Kalt felt compelled to revise his structural break analysis in response to Dr. McClave's exercise also suggests that it is a reliable expert opinion. The Court therefore concludes that Dr. McClave's opinion critiquing Dr. Kalt's structural break analysis is admissible under Daubert and Rule 702 because it is reliable and relevant to the issues before the Court.

2. Uninjured Class Members and Customer Indicator Variable

In response to the critiques of defense experts that Dr. Rausser's model produced an intolerable level of negative overcharges, i.e., uninjured class members, Dr. McClave undertook an exercise to "include an indicator ('dummy') variable in the model for each customer." McClave Merits Rep. at 14. For his customer indicator variable exercise, Dr. McClave included putative class members with at least two transactions, which includes more than 11,000 shippers. Id. Dr. McClave's purpose in running this exercise was to capture "the fact that prices may vary across shippers, for reasons that are not readily observable, but that are wholly unrelated to the conspiracy." Id. For example, "[i]f it's true that coal shippers have different characteristics, price characteristics than chemical shippers, those customer indicators

would tend to capture that effect." Class Certification Hr'g Tr. (Sept. 28, 2016) at 615. Dr. McClave explained that "[t]he dummy variable serves to capture the price effect of factors that characterize each customer" and that "[t]his is a well-accepted statistical method for capturing the effects of factors that are not readily observable," which defendants do not dispute. McClave Merits Rep. at 14. Dr. McClave called the dummy variable in his exercise a "customer indicator" variable. Id. at 15.

Dr. McClave found an average weekly overcharge of 15.6%, which is roughly equal to Dr. Rausser's model before Dr. Rausser incorporated the STB data on remand. McClave Merits Rep. at 15. Of those 11,000 shippers included in his exercise, Dr. McClave also concluded that "92% of customers, representing 99.5% of the Defendants' class period revenue, have net positive overcharges, and that 96% of customers, representing 99.8% of Defendants' class period revenue, are impacted by at least one transaction with an overcharge during the conspiracy period." Id. Conversely, "more than 80% of the 8% of customers with net zero or negative overcharges under the customer model have 10 or fewer transactions, and more than 90% of the 8% of customers have 30 or fewer transactions." Id. Dr. McClave confirmed that these percentages are almost identical when limiting the model to shippers with 10 or more shipments during the class period. Id. at 14-17 & Figure 2. From his customer indicator variable exercise, Dr. McClave concluded that all or virtually all shippers, regardless of the number of shipments, incurred net overcharges from the non-competitive application of fuel surcharges during the class period.

Defendants do not dispute that Dr. McClave's dummy customer indicator variable is a methodologically acceptable way to capture the differences in commodity, route, intermodal or carload, etc. Dummy variables are a common tool in regression analysis. Rubinfeld, supra, at

313 ("In an antitrust case, it may be a variable that takes on the value 1 to reflect the presence of the alleged anticompetitive behavior and the value 0 otherwise."); see also In re High-Tech Emp. Antitrust Litig., 2014 WL 1351040, at *16 n.35 ("This dummy variable technique is not uncommon in regression analysis."). While Dr. Kalt found much higher percentages of uninjured shippers and shipments without using a customer indicator variable, see Kalt Class Rep. ¶ 73 & Figure 13; Kalt Class Sur-Reply ¶ 46, he does not dispute Dr. McClave's results. Seeing no objections to Dr. McClave's methods in his customer indicator variable exercise, the Court finds it relevant and reliable expert testimony under Daubert and Rule 702.

PART THREE: LEGAL STANDARD AND RULE 23(A) FINDINGS AND CONCLUSIONS

I. LEGAL STANDARD FOR CLASS CERTIFICATION UNDER RULE 23

The D.C. Circuit vacated this Court's prior decision certifying the class based in part on the intervening Supreme Court precedent Comcast Corp. v. Behrend, 569 U.S. 27. See In re Rail Freight Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 255. This Court subsequently delayed its class certification hearing until after the Supreme Court decided another class action case, Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. 1036.[28] Consistent with the D.C. Circuit's mandate, the Court has reviewed Comcast and post-Comcast decisions from various circuit courts of appeals and applied those legal standards to the questions presented in this case.

[28] In its petition for certiorari, the petitioner in Tyson Foods, Inc. v. Bouaphakeo framed one question presented "as whether a class may be certified if it contains members who were not injured and have no legal right to any damages." 136 S. Ct. at 1049 (internal quotation marks and citation omitted). Petitioner, however, abandoned that argument in its merits brief, and the Supreme Court did not address the issue. Id. This question is relevant to an issue in this case.

A. Requirements of Rule 23 of the Federal Rules of Civil Procedure

A party that moves for class certification must "affirmatively demonstrate his compliance" with Rule 23 of the Federal Rules of Civil Procedure. Comcast Corp. v. Behrend, 569 U.S. at 33 (citing Wal-Mart Stores, Inc. v. Dukes, 564 U.S. 338, 350 (2011)). Those requirements fall into two categories. Under Rule 23(a), the moving party must show that "(1) the class is so numerous that joinder of all members is impracticable; (2) there are questions of law or fact common to the class; (3) the claims or defenses of the representative parties are typical of the claims or defenses of the class; and (4) the representative parties will fairly and adequately protect the interests of the class." FED. R. CIV. P. 23(a); see also DL v. District of Columbia, 860 F.3d 713, 723 (D.C. Cir. 2017).[29] These four express requirements commonly are referred to as numerosity, commonality, typicality, and adequacy. See In re Rail Freight Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 249. Failure to demonstrate any of the express requirements is fatal to class certification.

The moving party must also show that its proposed suit falls within at least one of the three categories of cases set forth in Rule 23(b). See FED. R. CIV. P. 23(b); DL v. District of Columbia, 860 F.3d at 723. In this case, plaintiffs move for class certification under Rule 23(b)(3), which permits the Court to certify a class action where "questions of law or fact common to class members predominate over any questions affecting only individual members, and that a class action is superior to other available methods for fairly and efficiently adjudicating the controversy." FED. R. CIV. P. 23(b)(3). These two requirements commonly are

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[29] The plaintiffs must also show two implied requirements: (1) that their proposed class is "sufficiently defined so as to be identifiable as a class"; and (2) that the named representatives "fall within the class." Vigus v. S. Ill. Riverboat/Casino Cruises, Inc., 274 F.R.D. 229, 235 (N.D. Ill. 2011) (citations omitted); see also Lindsay v. Gov't Emps. Ins. Co., 251 F.R.D. 51, 54 (D.D.C. 2008).

referred to as predominance and superiority. See Amchem Prods. Inc. v. Windsor, 521 U.S. 591, 615 (1997); In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 249. "The 'predominance inquiry tests whether proposed classes are sufficiently cohesive to warrant adjudication by representation.'" Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. at 1045 (quoting Amchem Prods., Inc. v. Windsor, 521 U.S. at 623). As Rule 23(b)(3) states, in deciding whether a moving party has satisfied the predominance and superiority requirements, pertinent considerations for a court include: "(A) the class members' interests in individually controlling the prosecution or defense of separate actions; (B) the extent and nature of any litigation concerning the controversy already begun by or against class members; (C) the desirability or undesirability of concentrating the litigation of the claims in the particular forum; and (D) the likely difficulties in managing a class action." FED. R. CIV. P. 23(b)(3)(A)-(D). Plaintiffs have the burden of proving each of the requirements of Rule 23 by a preponderance of the evidence. See In re Blood Reagents Antitrust Litig., 783 F.3d at 187 (citation omitted).

The Supreme Court has stated that "certification is proper only if 'the trial court is satisfied, after a rigorous analysis, that the prerequisites of Rule 23(a) have been satisfied.'" Comcast Corp. v. Behrend, 569 U.S. at 33 (quoting Wal-Mart Stores, Inc., v. Dukes, 564 U.S. at 350-51). In its initial class certification opinion, this Court concluded that the same rigorous analysis applied to the predominance requirement under Rule 23(b), Rail Freight III, 287 F.R.D. at 23, and the Supreme Court in Comcast confirmed that courts must apply a rigorous analysis to the predominance requirement under Rule 23(b). 569 U.S. at 33. In addition, the Supreme Court stated that the "Rule 23(b)(3)'s predominance criterion is even more demanding than Rule 23(a)." Comcast Corp. v. Behrend, 569 U.S. at 34 (citation omitted).

In examining the predominance requirement under Rule 23(b)(3), a court's rigorous analysis "begins . . . with the elements of the underlying cause of action." Neale v. Volvo Cars of N. Am., LLC, 794 F.3d 353, 370 (3d Cir. 2015) (quoting Erica P. John Fund, Inc. v. Halliburton, Co., 563 U.S. 804, 809 (2011)). Plaintiffs need not prove that each element of their claim is susceptible to class-wide proof; the rule requires that "common questions 'predominate over any questions affecting only individual members.'" Amgen Inc. v. Conn. Ret. Plans & Tr. Funds, 568 U.S. at 469 (emphasis in original) (quoting FED. R. CIV. P. 23(b)(3)). In other words, "[t]he predominance inquiry 'asks whether the common, aggregation-enabling, issues in the case are more prevalent or important that the non-common, aggregation-defeating individual issues.'" Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. at 1045 (citing RUBENSTEIN, supra, § 4:50); see also Butler v. Sears, Roebuck & Co., 727 F.3d 796, 801 (7th Cir. 2013). "When 'one or more of the central issues in the action are common to the class and can be said to predominate, the action may be considered proper under Rule 23(b)(3) even though other important matters will have to be tried separately, such as damages or some affirmative defenses peculiar to some individual class members.'" Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. at 1045 (quoting 7AA CHARLES ALAN WRIGHT, ARTHUR R. MILLER & MARY KAY KANE, FEDERAL PRACTICE AND PROCEDURE § 1778 (3d ed. 2005)); see also Kleen Prods. LLC v. Int'l Paper Co., 831 F.3d 919, 925 (7th Cir. 2016), cert. denied 137 S. Ct. 1582 (2017); In re Nexium Antitrust Litig., 777 F.3d 9, 21 (1st Cir. 2015).

In this case, plaintiffs allege that defendants engaged in price fixing, in violation of Section 1 of the Sherman Act. 2d Am. Compl. ¶ 1. To prevail on the merits of their claim at trial, plaintiffs will have to prove three elements: (1) a violation of the antitrust laws — here, Section 1 of the Sherman Act; (2) individual impact or injury resulting from that violation; and

(3) measurable damages. See In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d 1167, 1183 (N.D. Cal. 2013) (quoting In re New Motor Vehicles Canadian Exp. Antitrust Litig., 522 F.3d 6, 19 n.18 (1st Cir. 2008)); Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. 293, 307 (D.D.C. 2007). In antitrust cases, injury includes both injury-in-fact and so-called antitrust injury. See Cordes & Co. Fin. Servs., Inc. v. A.G. Edwards & Sons, Inc., 502 F.3d 91, 106 (2d Cir. 2007); see also In re Hydrogen Peroxide Antitrust Litig., 552 F.3d at 311.

At the class certification stage, however, plaintiffs need not prove their case. In re Hydrogen Peroxide Antitrust Litig., 552 F.3d at 311; see also Amgen Inc. v. Conn. Ret. Plans & Tr. Funds, 568 U.S. at 468; Walsh v. Ford Motor Co., 807 F.2d 1000, 1017-18 (D.C. Cir. 1986). Instead, plaintiffs' burden at the class certification stage is to demonstrate that the elements of their claim are "capable of proof at trial through evidence that is common to the class rather than individual to its members." In re Hydrogen Peroxide Antitrust Litig., 552 F.3d at 311-12 (emphasis added); see In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252; Messner v. Northshore Univ. HealthSystem, 669 F.3d at 818. The primary dispute before this Court is whether plaintiffs have demonstrated that their antitrust claim is capable of proof at trial through evidence that is common to the class.

B. Rigorous Analysis Post-Comcast

This case involves conflicting views by five dueling experts. Plaintiffs seek to prove injury and damages on a class-wide basis primarily through regression models developed by Dr. Gordon Rausser. Dr. Rausser has developed two regression models, a common factors model and a damages model, that, in plaintiffs' view, demonstrate that both injury and damages can be established at trial with evidence common to the class. See Rausser Merits Rep. at 8-11. After the Court permitted supplemental experts, plaintiffs hired Dr. Jeffrey Leitzinger to examine

Dr. Rausser's methodologies and conclusions, with which he ultimately agreed. See Leitzinger Rep. ¶ 10. Defendants' expert Dr. Joseph Kalt asserts that Dr. Rausser's regression models suffer from fatal flaws and that plaintiffs' supplemental experts have not sufficiently confirmed the soundness of Dr. Rausser's models. See generally Kalt Class Rep.; Kalt Class Sur-Reply.[30] In its rigorous analysis of the evidence presented by these experts, this Court not only must determine which evidence is most persuasive, it must resolve any factual disputes between the experts. See Parko v. Shell Oil Co., 739 F.3d 1083, 1085 (7th Cir. 2014) (citation omitted); In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1187. Because "class determination generally involves considerations that are enmeshed in the factual and legal issues comprising the plaintiff's cause of action," the Court's rigorous analysis will "frequently entail overlap with the merits of the plaintiff's underlying claim." Comcast Corp. v. Behrend, 569 U.S. at 34 (internal quotation marks and citation omitted). Rule 23, however, "grants courts no license to engage in free-ranging merits inquiries at the certification stage." Amgen Inc. v. Conn. Ret. Plans & Tr. Funds, 568 U.S. at 466. "Merits questions may be considered to the extent — but only to the extent — that they are relevant to determining whether the Rule 23 prerequisites for class certification are satisfied." Id. (citing Wal-Mart Stores, Inc. v. Dukes, 564 U.S. at 351 n.6).

In its initial class certification opinion, the Court stated that plaintiffs had to establish that their expert's theory of common impact was "plausible" and that Dr. Rausser's regression model seeking to prove common impact was "workable." Rail Freight III, 287 F.R.D.

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[30] In addition to Dr. Kalt and Dr. Leitzinger, the parties submitted the work of two other supplemental experts. Plaintiffs retained Dr. James McClave as a merits expert and to examine the methods and conclusions of Dr. Kalt in his critique of Dr. Rausser's work. See McClave Merits Rep. at 3; McClave Supp. Rep. at 2. Defendants retained Dr. Dennis Carlton to examine the methods and conclusions of Dr. Leitzinger in his review of Dr. Rausser's work. Carlton Rep. ¶ 4.

at 26. On appeal, the D.C. Circuit stated that this Court's standard of plausibility and workability — based primarily on First and Third Circuit case law, see id., was no longer acceptable after Comcast. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 255. The D.C. Circuit also stated that there must be a "reliable means of proving classwide injury in fact." Id. at 253 (emphasis added) (citing Concord Boat Corp. v. Brunswick Corp., 207 F.3d at 1056-57). Other courts have also concluded that plaintiffs seeking to prove common injury through regression models or other statistical evidence must establish that their expert's models and methodologies are reliable. See, e.g., In re Processed Egg Prods. Antitrust Litig., 312 F.R.D. 171, 194-95 (E.D. Pa. 2015); In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1192.

As the Court noted, supra at 19-21, the court of appeals did not explain how this reliability standard relates to the Daubert reliability standard. The Court concludes that, at a minimum, reliability under Rule 23 is a higher standard than reliability under Daubert. Under Rule 23, the Court must resolve expert disputes that bear on class certification. See Parko v. Shell Oil Co., 739 F.3d at 1085 (citation omitted); In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1187. This may require evaluating the conclusions and results of competing experts, which goes beyond the scope of the Daubert inquiry. See In re Processed Egg Prods. Antitrust Litig., 81 F. Supp. 3d at 417. Further, the D.C. Circuit stated that Comcast requires a "hard look at the soundness of statistical models that purport to show predominance." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 255. This "rigorous analysis" of whether plaintiffs have established predominance is certainly a more in-depth inquiry than required under Daubert.

As other courts have done, this Court will apply its rigorous analysis to both plaintiffs' arguments and evidence purporting to establish common impact and defendants' critiques of that evidence. See, e.g., In re Processed Egg Prods. Antitrust Litig., 312 F.R.D. at 189-90, 198; In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1217-20; In re Blood Reagents Antitrust Litig., No. 09-2081, 2015 WL 6123211, at *24 (E.D. Pa. Oct. 19, 2015). Defendants suggested at the class certification hearing that this approach may inappropriately shift the burden of proof to defendants. See Class Certification Hr'g Tr. (Sept. 26, 2016) at 143-44. Although the Court will rigorously analyze the critiques of defendants and their experts, the Court is mindful that the burden of proving class certification rests on the plaintiffs, and it will not allow that burden to shift to the defendants.

To summarize, the Court will resolve factual disputes relevant to Rule 23 requirements and make any factual determinations by a preponderance of the evidence. The Court must determine whether common questions predominate over individual questions, Amgen Inc. v. Conn. Ret. Plans & Tr. Funds, 568 U.S. at 460, specifically whether "common evidence and common methodology [can] be used to prove the elements of the underlying cause of action." In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1187. To answer this question, the Court will conduct a rigorous analysis of the documentary record and the expert opinions of Dr. Rausser, Dr. Leitzinger, and Dr. McClave, which plaintiffs offer as a means of proving class-wide injury and damages. See In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1217 (noting that "statistical and anecdotal evidence must be considered in tandem"). The Court also will rigorously analyze the expert opinions of Dr. Kalt and Dr. Carlton, who assert that plaintiffs have not produced reliable means for proving class-wide injury and damages through common evidence. The Court will certify the class only if it has determined that

plaintiffs have demonstrated by a preponderance of the evidence that the elements of their claim are "capable of proof at trial through evidence that is common to the class rather than individual to its members." In re Hydrogen Peroxide Antitrust Litig., 552 F.3d at 311-12.

II. RULE 23(A) FINDINGS AND CONCLUSIONS

In its initial class certification opinion, the Court found that the plaintiffs met each of the Rule 23(a) requirements by a preponderance of the evidence. Rail Freight III, 287 F.R.D. at 28-35. On remand, the parties do not dispute any of the Court's Rule 23(a) findings; nor did the D.C. Circuit discuss the Court's Rule 23(a) findings in its decision. The Court therefore concludes again that plaintiffs have met their burden under Rule 23(a) of the Federal Rules of Civil Procedure.

A. Two Implied Requirements

1. Class Definition

The first implied requirement of Rule 23(a) is that the putative class must be "sufficiently defined so as to be identifiable as a class." Vigus v. S. Ill. Riverboat/Casino Cruises, Inc., 274 F.R.D. 229, 235 (N.D. Ill. 2011); see also Johnson v. District of Columbia, 248 F.R.D. 46, 52 (D.D.C. 2008); Pigford v. Glickman, 182 F.R.D. 341, 346 (D.D.C. 1998). "The requirement that a class be clearly defined is designed primarily to help the trial court manage the class." Pigford v. Glickman, 182 F.R.D. at 346. This requirement "is not designed to be a particularly stringent test, but plaintiffs must at least be able to establish that the general outlines of the membership of the class are determinable at the outset of the litigation." Id. (internal quotation marks and citation omitted). A court therefore should deny class certification where the class definitions are "overly broad, amorphous, and vague." County of Monroe v.

Priceline.com, Inc., 265 F.R.D. 659, 666 (S.D. Fla. 2010) (quoting Perez v. Metabolife Int'l, Inc., 218 F.R.D. 262, 269 (S.D. Fla. 2003)); see also Johnson v. District of Columbia, 248 F.R.D. at 52.

> Plaintiffs seek certification of the following class:
>
> All entities or persons that at any time from July 1, 2003 until December 31, 2008 (the "Class Period") purchased rate-unregulated rail freight transportation services directly from one or more of the Defendants, as to which Defendants assessed a stand-alone rail freight fuel surcharge applied as a percentage of the base rate for the freight transport (or where some or all of the fuel surcharge was included in the base rate through a method referred to as "rebasing") ("Fuel Surcharge").
>
> Excluded from this Class definition are (a) Defendants, any subsidiaries or affiliates of Defendants, any of Defendants' co-conspirators, whether or not named as a Defendant in the Complaint, and all federal governmental entities, and (b) all entities or persons that paid a Fuel Surcharge directly to any of the Defendants solely pursuant to a railroad-shipper contract that was (i) entered into before July 1, 2003, and (ii) provided for a stand-alone Fuel Surcharge to be paid under a predetermined formula specifically set forth in the contract.

Class Mot. at 1. The Court previously found that this putative class was sufficiently defined to be identifiable as a class under Rule 23(a). See Rail Freight III, 287 F.R.D. at 30. On remand, defendants have presented no arguments that the class definition accepted by this Court in its initial class certification opinion is overly broad, amorphous, or vague. See County of Monroe v. Priceline.com, Inc., 265 F.R.D. at 666. The Court therefore finds by a preponderance of the evidence that plaintiffs' proposed class is defined so as "to establish that the general outlines of the membership of the class are determinable at the outset of the litigation." Pigford v. Glickman, 182 F.R.D. at 346 (internal quotation marks and citation omitted).

2. Named Representatives Within the Putative Class

The second implied requirement of Rule 23(a) is that the named representative plaintiffs must "fall within the class." Vigus v. S. Ill. Riverboat/Casino Cruises, Inc., 274 F.R.D. at 235. Plaintiffs assert, and defendants do not dispute, that during the class period each of the eight named representatives directly purchased from one or more of the defendants rail freight services as to which a fuel surcharge was applied. See Class Mem. at 1, 58-60. Consequently, the Court finds by a preponderance of the evidence that the second implied requirement of Rule 23(a) is met: each of the named representative plaintiffs falls within the putative class.

B. Four Express Requirements

1. Numerosity

The first express requirement of Rule 23(a) is numerosity: the putative class must be "so numerous that joinder of all members is impracticable." FED. R. CIV. P. 23(a)(1). Typically, a class in excess of 40 members is sufficiently numerous to satisfy this requirement. See Coleman ex rel. Bunn v. District of Columbia, 306 F.R.D. 68, 76 (D.D.C. 2015). "Mere conjecture, without more, is insufficient to establish numerosity, but plaintiffs do not have to provide an exact number of putative class members in order to satisfy the numerosity requirement." Pigford v. Glickman, 182 F.R.D. at 347; see also Coleman ex rel. Bunn v. District of Columbia, 306 F.R.D. at 76. Defendants do not contest the numerosity requirement. Plaintiffs and Dr. Rausser previously represented that the putative class included approximately 30,000 shippers. See Pls. Supp. Mem. at 58. In his Supplemental Report, Dr. Rausser only includes data for approximately 16,000 shippers as opposed to 30,000 shippers. Kalt Class Rep. ¶ 73 n.103. This change has no bearing on the Court's conclusion that plaintiffs satisfy the numerosity requirement. "When the class is large" — here, approximately 16,000 shippers —

"numbers alone are dispositive." Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. at 306. The Court therefore finds that plaintiffs have satisfied their burden of showing by a preponderance of the evidence that the putative class "is so numerous that joinder of all members is impracticable." FED. R. CIV. P. 23(a)(1).

2. Commonality

The second express requirement of Rule 23(a) is commonality: there must be "questions of law or fact common to the class." FED. R. CIV. P. 23(a)(2). "The touchstone of the commonality inquiry is 'the capacity of a classwide proceeding to generate common answers apt to drive the resolution of the litigation.'" Coleman ex rel. Bunn v. District of Columbia, 306 F.R.D. at 82 (quoting Wal-Mart Stores, Inc. v. Dukes, 564 U.S. at 350). "A class may satisfy the commonality requirement even if factual distinctions exist among the claims of putative class members." Id. "The question is 'whether dissimilarities between the claims may impede a common resolution.'" Id. (quoting 7A CHARLES ALAN WRIGHT, ARTHUR R. MILLER, & MARY KAY KANE, FEDERAL PRACTICE AND PROCEDURE § 1763 (3d ed. 2017)).

In antitrust class actions, "numerous courts have held that allegations concerning the existence, scope, and efficacy of an alleged antitrust conspiracy present important common questions sufficient to satisfy the commonality requirement." Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. at 300 (internal quotation marks and citation omitted). As plaintiffs assert, and as defendants do not dispute, the question whether defendants engaged in a conspiracy — the first element of plaintiffs' claim — is an issue that is common to all putative class members because the answer to that question will focus exclusively on defendants' conduct. See Class Mem. at 57. The Court therefore finds by a preponderance of the evidence that "there are questions of law or fact common to the class." FED. R. CIV. P. 23(a)(2).

3. Typicality

The third express requirement of Rule 23(a) is typicality: "the claims or defenses of the representative parties [must be] typical of the claims or defenses of the class." FED. R. CIV. P. 23(a)(3). "Typicality is satisfied if each class member's claim arises from the same course of events that led to the claims of the representative parties and each class member makes similar legal arguments to prove the defendant's liability." Howard v. Liquidity Servs. Inc., No. 14-1183, 2017 WL 3948454, at *11 (D.D.C. Sept. 6, 2017) (internal quotation marks and citation omitted); see also Coleman ex rel. Bunn v. District of Columbia, 306 F.R.D. at 83. "The requirement has been liberally construed by courts . . . [and] in the antitrust context, typicality will be established by plaintiffs and all class members alleging the same antitrust violations by defendants." Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. at 301 (alteration in original) (internal quotation marks and citation omitted).

Plaintiffs contend that the typicality requirement easily is satisfied in this case because "all named Plaintiffs and all Class members seek overcharge damages pursuant to an identical price-fixing claim under Section 1 of the Sherman Act." Class Mem. at 58. As plaintiffs describe it, "[t]he claims of the named Plaintiffs and the absent Class members alike arose out of the same course of events: Defendants' conspiracy to impose stand-alone, rate-based Fuel Surcharges in order to raise shipping prices across the board." Id. On remand, defendants no longer argue that plaintiffs have failed to satisfy the typicality requirement. The Court finds that the claims of the eight named class representatives "are based on the same legal theory as the claims of the other class members" and that their injuries "arise from the same course of conduct that gives rise to the other class members' claims." Coleman ex rel. Bunn v. District of Columbia, 306 F.R.D. at 83 (quoting Bynum v. District of Columbia, 214 F.R.D. 27,

35 (D.D.C. 2003)). Consequently, plaintiffs have satisfied their burden of showing by a preponderance of the evidence that "the claims or defenses of the representative parties are typical of the claims or defenses of the class." FED. R. CIV. P. 23(a)(3).

4. Adequacy of Representation

The fourth and final express requirement of Rule 23(a) is adequacy. It requires that "the representative parties will fairly and adequately protect the interests of the class." FED. R. CIV. P. 23(a)(4). Thus, this requirement "necessitates an inquiry into the adequacy of representation, including the quality of class counsel, any disparity of interest between class representatives and members of the class, communication between class counsel and the class and the overall context of the litigation." Pigford v. Glickman, 182 F.R.D. at 350. "A proposed representative is 'adequate' if (1) his interests do not conflict with those of other class members, and (2) he will vigorously prosecute the interests of the class through qualified counsel." Lindsay v. Gov't Emps. Ins. Co., 251 F.R.D. at 55; see also Howard v. Liquidity Servs. Inc., 2017 WL 3948454, at *25.

On remand, defendants do no dispute the eight named plaintiffs as class representatives; nor do they object to Quinn Emanuel Urquhart & Sullivan, LLP and Hausfeld LLP as qualified class counsel. The Court finds that plaintiffs have met their burden of showing by a preponderance of the evidence that "the representative parties will fairly and adequately protect the interests of the class," FED. R. CIV. P. 23(a)(4), because the interests of the eight named representatives do not conflict with those of other putative class members, and because they will vigorously prosecute the interests of the class through qualified counsel. See DL v. District of Columbia, 860 F.3d at 726; Lindsay v. Gov't Emps. Ins. Co., 251 F.R.D. at 55.

PART FOUR: RULE 23(B) FINDINGS AND CONCLUSIONS

I. PREDOMINANCE

Rule 23(b)(3) requires that the Court find by a preponderance of the evidence that "the questions of law or fact common to class members predominate over any questions affecting only individual members." FED. R. CIV. P. 23(b)(3). As discussed, supra at 105-06, in examining the predominance requirement under Rule 23(b)(3), a court's rigorous analysis "begins . . . with the elements of the underlying cause of action." Neale v. Volvo Cars of N. Am., LLC, 794 F.3d at 370 (quoting Erica P. John Fund, Inc. v. Halliburton, Co., 563 U.S. at 809). The Court must "scrutiniz[e] plaintiffs' legal causes of action to determine whether they are suitable for resolution on a classwide basis." McCarthy v. Kleindienst, 741 F.2d 1406, 1412 n.6 (D.C. Cir. 1984); see Marcus v. BMW of N. Am., LLC, 687 F.3d 583, 600 (3d Cir. 2012). The Court therefore examines "each element of [plaintiffs'] legal claim through the prism of Rule 23(b)(3)" to determine whether plaintiffs have satisfied the predominance requirement. Marcus v. BMW of N. Am., LLC, 687 F.3d at 600 (internal quotation marks and citation omitted). The Court must "give careful scrutiny to the relation between common and individual questions in [the] case." Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. at 1045. "An individual question is one where 'members of a proposed class will need to present evidence that varies from member to member,' while a common question is one where 'the same evidence will suffice for each member to make a prima facie showing [or] the issue is susceptible to generalized, class-wide proof." Id. (alteration in original) (quoting RUBENSTEIN, supra, § 4:50). "The predominance inquiry 'asks whether the common, aggregation-enabling, issues in the case are more prevalent or important than the non-common, aggregation-defeating, individual issues.'" Id. (quoting RUBENSTEIN, supra, § 4:49). If proof of the essential elements of the claim

requires individual treatment, then common questions do not predominate, and class certification is "unsuitable." In re Hydrogen Peroxide Antitrust Litig., 552 F.3d at 311 (citation omitted).

In this case, plaintiffs allege that defendants engaged in price fixing, in violation of Section 1 of the Sherman Act. See 2d Am. Compl. ¶¶ 1-2. Thus, to prevail on the merits of their claim at trial, plaintiffs will have to prove three elements: (1) a violation of the antitrust laws — here, Section 1 of the Sherman Act; (2) individual impact resulting from that violation; and (3) measurable damages. See In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1183 (citation omitted); In re Processed Egg Prods. Antitrust Litig., 312 F.R.D. at 182 (citation omitted). At the class certification stage, plaintiffs' burden is different: plaintiffs must show by a preponderance of the evidence that the elements of their claim are "capable of proof at trial through evidence that is common to the class rather than individual to its members." In re Hydrogen Peroxide Antitrust Litig., 552 F.3d at 311-12.

A. Violation of Antitrust Law

Plaintiffs have alleged that defendants engaged in a horizontal price-fixing conspiracy to coordinate their fuel surcharge programs in order to effect an overall supra-competitive total price increase on their customers, in violation of Section 1 of the Sherman Act. See 2d Am. Compl. ¶¶ 1-2. A horizontal price-fixing conspiracy, as alleged here, is a per se violation of the Sherman Act. See, e.g., Texaco Inc. v. Dagher, 547 U.S. 1, 5 (2006); NYNEX Corp. v. Discon, Inc., 525 U.S. 128, 133-34 (1998); In re Publ'n Paper Antitrust Litig., 690 F.3d 51, 61 (2d Cir. 2012). And the parties agree that this element of plaintiffs' claim is capable of proof at trial through evidence that is common to the class. See Class Mem. at 65-66; Class Certification Hr'g Tr. (Oct. 7, 2010) at 161 (defendants' counsel, acknowledging that "whether there was or was not a conspiracy is in fact capable of common proof, so that's really

not an issue in the predominance analysis"). That is because plaintiffs' allegations of price fixing indisputably "will focus on the actions of the defendants, and, as such, proof for these issues will not vary among class members." In re Vitamins Antitrust Litig., 209 F.R.D. 251, 264 (D.D.C. 2002); see Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. at 308. The Court therefore finds by a preponderance of the evidence that the first element of plaintiffs' claim is capable of proof at trial through evidence that is common to the class rather than individual to its members.

B. Impact

On remand, the central issue in this case again is whether the second element of plaintiffs' claim — individual impact resulting from the alleged conspiracy — is capable of common proof. The impact element involves two distinct components: injury-in-fact and antitrust injury. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 249 & n.5; Bassett v. Nat'l Collegiate Athletic Ass'n, 528 F.3d 426, 434 (6th Cir. 2008); Cordes & Co. Fin. Servs., Inc. v. A.G. Edwards & Sons, Inc., 502 F.3d at 106. The injury-in-fact question asks the "familiar factual question whether the plaintiff has indeed suffered harm," Cordes & Co. Fin. Servs., Inc. v. A.G. Edwards & Sons, Inc., 502 F.3d at 106, whereas antitrust injury asks "the legal question whether any such injury is 'injury of the type the antitrust laws were intended to prevent and that flows from that which makes defendants' acts unlawful.'" Id. (quoting Brunswick Corp. v. Pueblo Bowl-O-Mat, Inc., 429 U.S. 477, 489 (1977)); see also Meijer, Inc. v. Biovail Corp., 533 F.3d 857, 862 (D.C. Cir. 2008). Antitrust injury is injury to competition, not just injury to an individual. See Andrx Pharm., Inc. v. Biovail Corp. Int'l, 256 F.3d 799, 812 (D.C. Cir. 2001). An antitrust plaintiff is required to prove antitrust injury to ensure that a plaintiff can recover "only if the loss stems from a competition-reducing aspect or

effect of the defendant's behavior." Atlantic Richfield Co. v. USA Petroleum Co., 495 U.S. 328, 344 (1990) (emphasis in original); Nat'l ATM Council, Inc. v. Visa Inc., 922 F. Supp. 2d 73, 80 (D.D.C. 2013). The Court will first address a preliminary argument of whether plaintiffs have changed their theory of liability on remand. The Court then examines the parties' arguments regarding whether antitrust injury and injury-in-fact are capable of proof at trial through evidence that is common to the class.

1. Plaintiffs' Theory of Liability

The Court first addresses two preliminary issues regarding plaintiffs' theory of liability on remand: (1) whether plaintiffs have changed their theory of liability on remand and (2) how many theories of liability plaintiffs have asserted.

First, defendants argue that on remand plaintiffs have changed their theory of liability. See Defs. Supp. Opp. at 4-9. In their supplemental memorandum in support of class certification, plaintiffs assert that the majority of legacy shippers — shippers who entered contracts with defendants before the start of the alleged conspiracy — also were harmed by the alleged conspiracy, and that any overcharges found for these shippers are not "false positives." See Pls. Supp. Mem. at 13-15, 53-56. Defendants argue that this is a fundamental change in plaintiffs' theory of liability, which purported to show that defendants "conspired to increase total prices by widespread application and enforcement of coordinated, and aggressive, fuel surcharges." Defs. Supp. Opp. at 4 (quoting Rail Freight III, 287 F.R.D. at 55). Defendants also contend that plaintiffs have "abandoned" their argument that fuel surcharges were more aggressive by arguing that legacy shippers who signed contracts — and presumably negotiated a fuel surcharge rate — before the start of the alleged conspiracy were also harmed. Id. at 9.

Plaintiffs maintain that they have not changed their theory of liability, Pls. Supp. Reply at 5, and the Court agrees. Plaintiffs have repeatedly argued — and still argue on remand — that the fuel surcharge programs during the class period were more aggressive than fuel surcharges applied before the start of the allege conspiracy. See id. at 6-7. Plaintiffs certainly have offered a new argument that legacy shippers were also harmed by the alleged conspiracy, but they have done so in response to the court of appeals, which required plaintiffs to produce specific evidence and argument that legacy shippers were harmed by the alleged conspiracy and Dr. Rausser's damages model therefore reliably estimates overcharges for those shippers. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 254. In light of the mandate from the court of appeals, it would have been irresponsible for plaintiffs not to develop these legacy shipper arguments on remand.

Defendants also contend that plaintiffs' new argument regarding legacy shippers is inconsistent with plaintiffs' original theory of liability. See Defs. Supp. Opp. at 9. They argue that plaintiffs are attempting to "evade the D.C. Circuit's holding" by abandoning their previous arguments regarding more aggressive fuel surcharges and a structural break between the pre-class period and the start of the alleged conspiracy and "conform[ing] the liability theory to whatever the model finds." Id. Defendants are correct that the D.C. Circuit stated that plaintiffs' argument on appeal that "antitrust violations may also have tainted even legacy contracts . . . runs directly counter" to this Court's previous "factual finding that 'the fuel surcharge programs applied before the class period were nothing like the widespread and uniform application of standardized fuel surcharges during the class period.'" In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 254 (quoting Rail Freight III, 287 F.R.D. at 48).

Plaintiffs assert, however, that defendants' false positives argument to the court of appeals was based on a false premise that all legacy shippers were bound by rates negotiated before the start of the alleged conspiracy. See Pls. Supp. Mem. at 13-15. On remand, plaintiffs submit that supplemental expert work from Dr. Rausser demonstrates that "a large percentage of shipments under what defendants identified as 'legacy' contracts were, in fact, subjected to FSC formulas established while the conspiracy was ongoing and were thereby tainted by the conspiracy." Id. at 13. According to plaintiffs, because legacy shippers were in fact harmed by the alleged conspiracy, Dr. Rausser's damages model reliably shows overcharges for legacy shipments and his damages model is not prone to false positives. Id. at 3-4. The Court will address — after rigorous analysis — whether it agrees with plaintiffs' assertions regarding legacy shippers. See infra at 173-82. But for now, the Court agrees with plaintiffs that they have not rewritten or abandoned their original theory of liability by arguing that legacy shippers were also harmed by the alleged conspiracy.

Second, plaintiffs argue on remand that defendants have attempted to segregate plaintiffs' single theory of liability into multiple theories, which, if true, would raise the problem the Supreme Court confronted in Comcast. See Pls. Supp. Reply at 8 & n.34. In Comcast, the plaintiffs had proposed four theories of antitrust impact. 569 U.S. at 31. The district court rejected three of those theories, but nevertheless certified the class, declining to consider the argument that the damages model attributed damages based on all four theories rather than on the only theory remaining in the case. Id. The Third Circuit affirmed the district court's decision to certify the class, stating that defendants' argument was a merits argument that had no place at class certification. Id. at 32. The Supreme Court disagreed. The plaintiffs' failure to produce a damages model tied to the only remaining theory of liability precluded a finding of

predominance. Id. at 38; see also Kleen Prods. LLC v. Int'l Paper Co., 831 F.3d at 929 ("Comcast insists that the damages theory must correspond to the theory of liability."). The Supreme Court noted that "[t]he first step in a damages study is the translation of the legal theory of the harmful event into an analysis of the economic impact of that event." Comcast Corp. v. Behrend, 569 U.S. at 38 (emphasis in original) (quoting FED. JUDICIAL CTR., REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 432 (3d ed. 2011)).

As plaintiffs note, Dr. Rausser's damages model "does not purport to quantify separately the impact of what defendants might argue are various elements of the conspiracy (eliminating competition on FSCs vs. standard formulas vs. aggressive enforcement, etc.)." Pls. Supp. Reply at 7-8. Defendants do attempt to separate out the various aspects of the alleged conspiracy, see, e.g., Defs. Supp. Opp. at 25-32, 58-63, but plaintiffs have not alleged separate theories of liability. As the Court noted in its initial opinion, plaintiffs have alleged one type of injury: a horizontal price-fixing scheme in which defendants "'conspired to use [fuel surcharges] . . . as a means to fix, raise, maintain, and/or stabilize prices,' and to 'increase prices across-the-board . . . through the mechanism of a uniform surcharge applied to as many customers as possible." Pls. Supp. Reply at 6 (quoting Consolidated Am. Compl. ¶¶ 2-3, 54); see also Rail Freight III, 287 F.R.D. at 41; 2d Am. Compl. ¶¶ 2-4, 54. This has not changed.

The Supreme Court's decision in Comcast does not require separating the elements of plaintiffs' theory of liability as defendants implicitly do on remand. "[T]he character and effect of a conspiracy are not to be judged by dismembering it and viewing its separate parts, but only by looking at it as a whole." Cont'l Ore Co. v. Union Carbide & Carbon Corp., 370 U.S. 690, 699 (1962) (citation omitted). Plaintiffs' have consistently alleged throughout this litigation one theory of liability — a conspiracy to raise all-in rates through the use of fuel

surcharges in the face of "a long-term trend of declining freight rates." Pls. Supp. Mem. at 6; see also Rail Freight III, 287 F.R.D. at 41.

2. Antitrust Injury

The Court now turns to whether plaintiffs have established by a preponderance of the evidence that the legal question of antitrust injury is common to the class and predominates over any individual issues. In order to establish antitrust injury, the legal component of the impact element at trial, plaintiffs "must prove that the defendants engaged in an anti-competitive manipulation of the markets." In re Ethylene Propylene Diene Monomer (EPDM) Antitrust Litig., 256 F.R.D. 82, 87 (D. Conn. 2009) (citing Cordes & Co. Fin. Servs., Inc. v. A.G. Edwards & Sons, Inc., 502 F.3d at 105-07). The antitrust laws were enacted for "the protection of competition, not competitors." Andrx Pharm., Inc. v. Biovail Corp. Int'l, 256 F.3d at 812 (emphasis in original) (quoting Brunswick Corp. v. Pueblo Bowl-O-Mat, Inc., 429 U.S. at 488). Where there is no competition, a plaintiff cannot show antitrust injury. See Nat'l ATM Council v. Visa, Inc., 922 F. Supp. 2d at 91 n.16; In re Tobacco/Governmental Health Care Costs Litig., 83 F. Supp. 2d 125, 134-35 (D.D.C. 1999).

As the Court noted in Rail Freight III, it was initially unclear from defendants' papers if they disputed whether antitrust injury can be established at trial with common evidence. 287 F.R.D. at 39 (citing Class Opp. at 50-56). But at the 2010 class certification hearing, defendants stated that they do dispute whether some putative class members — specifically, captive shippers — suffered antitrust injury. See Class Certification Hr'g Tr. (Oct. 7, 2010) at 171-73. According to defendants, certain shippers in plaintiffs' putative class are "captive shippers," also referred to as "sole served shippers." Class Certification Hr'g Tr. (Oct. 6, 2010) at 30. For various reasons, including geographic location, these shippers have "no option but to

use a single railroad." Class Certification Hr'g Tr. (Oct. 7, 2010) at 172; see also Rausser Merits Rep. at 144-46. Defendants argue that these captive shippers could not suffer antitrust injury as a matter of law because they had no competition in the first place and therefore have "no reduction in competition as a result of the alleged wrong." Class Certification Hr'g Tr. (Oct. 7, 2010) at 172. Defendants also argue that identifying such captive shippers would require individualized inquiry. Id. at 176.

Plaintiffs disagree. Plaintiffs argue that captive shippers are subject to competitive forces and that defendants have admitted that they imposed fuel surcharges "on all shippers alike, without regard for whether the shipper was captive or non-captive, or whether the shipper had access to alternative modes of transportation." Class Reply at 14-15. They contend that Dr. Rausser's analysis confirms that captive shippers did not escape the alleged conspiracy. See Rausser Merits Rep. at 144-49. Dr. Rausser opines that the "transaction data reveal that so-called captive shippers paid the same Fuel Surcharges as other Class members[,] and there is no transactional or other evidence that they received discounts." Id. at 146. On remand, defendants have offered no new arguments or new evidence as to why captive shippers were not subject to competitive forces. The Court therefore again concludes that captive shippers are subject to competitive forces and therefore can suffer antitrust injury. See Rail Freight III, 287 F.R.D. at 41-43.

The statements of defendants' own executives contradict defendants' claim that captive shippers are not subject to competition. NS's chief executive officer, Charles W. Moorman, testified before Congress in 2007 that even captive shippers are subject to "competitive constraints [that] are real," and he expressly acknowledged that "even where there is only one railroad serving a facility, there are market factors at play." Corrected HD Ex. 36,

Written Statement of Charles W. Moorman (Sept. 20, 2007) at 16. Similarly, UP's chief executive officer, James Young, agreed that railroads place "competitive constraints" on each other, even in the case of captive shippers. HD Ex. 66, Young Dep. (Aug. 4, 2010) at 201. And CSX has acknowledged in internal documents that "[s]tudies have shown that, in aggregate, captive shippers don't pay higher prices than non-captive shippers," and that "CSX[] sets prices based on all competitive factors." HD Ex. 37, CSX Talking Points Response to Escalation Resources - Fuel Surcharge Alert, at CSXFSC000153187.

That captive shippers enjoy competition is further reflected by the experience of one of the named plaintiffs in this case before and during the class period. U.S. Magnesium has an operating facility outside of Salt Lake City, Utah. UP owns the single rail line accessible to the plant, making U.S. Magnesium a captive shipper. See Class Certification Hr'g Tr. (Oct. 6, 2010) at 92-93. In December 2002, before the class period, U.S. Magnesium negotiated out of the application of a fuel surcharge. See RD Ex. 10, E-mail from Howard Kaplan, to B. Denker (Dec. 19, 2002, 7:31 AM), at USM005647 (UP proposing to U.S. Magnesium a 4% increase on all rates and application of a fuel surcharge, but ultimately agreeing to a 4% across-the-board increase without a fuel surcharge). But one year later, during the period when plaintiffs say that defendants were conspiring to impose fuel surcharges uniformly as to all shippers, the application of a fuel surcharge was "mandate[d] by UP management." RD Ex. 72, E-mail from B. Denker, to Howard Kaplan (Dec. 22, 2003, 10:17 AM), at USM005663.

Moreover, defendants' executives expressly have denied in their depositions that they would have tried to impose more aggressive programs on captive shippers than they were able to impose on non-captive shippers. BNSF's chief executive officer, Matthew K. Rose, stated that BNSF had never considered having a higher or more onerous fuel surcharge for

captive shippers, and that such an approach would "violate [BNSF] principle." HD Ex. 72, Rose Dep. (July 16, 2010) at 232. UP's chief financial officer, Robert Knight, Jr. acknowledged that he was unaware of any discussions on the topic of having separate fuel surcharge programs for captive shippers. HD Ex. 70, Knight Dep. (July 9, 2010) at 64. These statements are consistent with Dr. Rausser's analysis and conclusion — which the Court finds persuasive — that defendants' transaction data show that captive shippers paid the same fuel surcharges as other putative class members during the class period. Rausser Merits Rep. at 146.

The Court therefore finds by a preponderance of the evidence that the railroads are affected by competitive constraints that apply to both captive and non-captive shippers, and that plaintiffs have satisfied the first part of the impact element for all putative class members by showing that the legal question of antitrust injury is common to the class and predominates over individual issues. See Cordes & Co. Fin. Servs., Inc. v. A.G. Edwards & Sons, Inc., 502 F.3d at 107.

3. Injury-in-Fact

In order to prevail at trial on their Sherman Act claim, plaintiffs must prove not only an antitrust violation — here, that defendants conspired on their fuel surcharge programs — but also "the causal link between the antitrust violation and the damages sought by plaintiffs." In re New Motor Vehicles Canadian Export Antitrust Litig., 522 F.3d at 19 n.18, see also Fed. Prescription Serv., Inc. v. Am. Pharm. Ass'n, 663 F.2d 253, 268 (D.C. Cir. 1981). Plaintiffs "need not exhaust all possible alternative sources of injury in fulfilling [their] burden of proving compensable injury under" the antitrust laws, but they must show that the antitrust violation was the "material cause of the injury." Andrx Pharm., Inc. v. Biovail Corp. Int'l, 256 F.3d at 808 (quoting Zenith Radio Corp. v. Hazeltine Research, Inc., 395 U.S. 100, 114 n.9 (1969)).

If plaintiffs would have suffered the same injury absent a conspiracy, then plaintiffs will fail on the merits of their claim. See Fed. Prescription Serv., Inc. v. Am. Pharm. Ass'n, 663 F.2d at 268. In other words, if the same alleged injury would have been caused by independent, non-conspiratorial forces, then no causal link exists between the alleged antitrust violation and the injury. And if individualized inquiry is necessary to make such a determination on causation, then plaintiffs will have failed to show that common questions predominate as to injury-in-fact. See Kottaras v. Whole Foods Mkt., Inc., 281 F.R.D. 16, 22-23 (D.D.C. 2012).

This causation question — whether an antitrust violation was a material cause of an injury — commonly is assessed by reference to what parties and their experts refer to as the "but-for world." See Suture Express, Inc. v. Owens & Minor Distribution, Inc., 851 F.3d 1029, 1044 (10th Cir. 2017). In antitrust overcharge cases, such as this one, "the usual measure of damage is the difference between the illegal price that was actually charged and the price that would have been charged 'but for' the violation." AREEDA ET AL., supra, ¶ 392a; see In re Ethylene Propylene Diene Monomer (EPDM) Antitrust Litig., 256 F.R.D. at 88. This hypothetical construct is a world that is "free of the restraints and conduct alleged to be anticompetitive." Blades v. Monsanto Co., 400 F.3d 562, 569 (8th Cir. 2005) (quoting Concord Boat Corp. v. Brunswick Corp., 207 F.3d at 1055); see Cordes & Co. Fin. Servs., Inc. v. A.G. Edwards & Sons, Inc., 502 F.3d at 107. One way of demonstrating that common questions predominate on the issue of injury-in-fact

> is to show that there is a common method for proving that the class plaintiffs paid higher actual prices than in the but-for world, such as using an econometric regression model incorporating a variety of factors to demonstrate that a conspiracy variable was at work during the class period, raising prices above the "but-for" level for all plaintiffs.

In re Ethylene Propylene Diene Monomer (EPDM) Antitrust Litig., 256 F.R.D. at 88. This is precisely what plaintiffs have attempted to do through their expert Dr. Rausser. And in order to prevail at the class certification stage, plaintiffs now must show by a preponderance of the evidence that common proof can be used to answer the questions (1) whether putative class members paid a fuel surcharge because of the alleged conspiracy; and, if so, (2) whether payment of that fuel surcharge caused putative class members to pay more for shipping than they otherwise would have paid.

The primary dispute on class certification is whether injury-in-fact can be established at trial on a class-wide basis through common evidence and thus whether questions of fact common to the class predominate over factual questions affecting only individual class members. See FED. R. CIV. P. 23(b)(3). As the Court previously found, plaintiffs' documentary evidence of conspiracy and defendants' intent to uniformly apply and enforce new, more aggressive fuel surcharges in the class period is substantial. Rail Freight III, 287 F.R.D. at 48-52. As plaintiffs acknowledge, however, both aspects of their evidence — both the extensive factual record and Dr. Rausser's expert opinions, based on his common factors and damages models — are necessary to determine "whether or not there is evidence . . . that the issue of impact is susceptible to common proof at trial to the class as a whole." Class Certification Hr'g Tr. (Sept. 26, 2016) at 38-39; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 321 ("[I]t is the combination of the common factors and the damages model and the full set of record evidence in the case which provides the basis to make a finding of common impact."). The documentary evidence cannot be considered in isolation. It must be viewed together with Dr. Rausser's common factors and damages models to determine whether plaintiffs can prove class-wide injury or impact through common evidence. See supra at 40-41. As the court of

appeals said, Dr. Rausser's "models are essential to the plaintiffs' claim they can offer common evidence of classwide injury." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 253; see also In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1217 (citation omitted) ("[S]tatistical and anecdotal evidence must be considered in tandem."); id. at 1187.

The Court therefore proceeds to a discussion of the evidence plaintiffs have presented in support of their predominance argument and the challenges made to that evidence by defendants. In Part A of what follows, the Court discusses the documentary evidence that plaintiffs have introduced in support of their argument that the fuel surcharge formulas used during the alleged conspiracy were more aggressive than the fuel surcharge formulas during the pre-class period. In that context, it also discusses defendants' arguments concerning causation and coverage and Dr. Rausser's failure to create a coverage model. In Part B, the Court discusses four specific challenges made by defendants to Dr. Rausser's regression models and finds them wanting: (1) Dr. Rausser's common factors model omits key variables and does not demonstrate common impact; (2) Dr. Rausser's use of a constant fuel coefficient in his damages model makes the model unreliable; (3) Dr. Kalt's structural break analyses undermine Dr. Rausser's damages model because the analyses show that Dr. Rausser's damages model generates structural breaks and overcharges throughout the pre-class and class periods; and (4) Dr. Rausser's damages model is prone to certain "false positives" other than the one highlighted by the court of appeals (relating to legacy shippers) and therefore detects injury where none could exist. Finally, in Part C, the Court discusses three additional criticisms put forward by defendants which the Court finds persuasive and which separately or together undermine the reliability of Dr. Rausser's damages model, making it impossible for plaintiffs to

satisfy the predominance requirement of Rule 23(b)(3): (1) a large portion of the class traffic reflected in Dr. Rausser's damages model was intermodal traffic that was subject to competitively negotiated formulas established during the class period and which never changed; (2) Dr. Rausser's damages model finds unexplainable overcharges with respect to legacy shippers; and (3) there are too many uninjured shippers in the class who cannot be identified or sufficiently explained by prediction error to satisfy the "all or virtually all" standard for predominance under established case law.

a. Plaintiffs' Record Evidence of Class-wide Impact

i. Documentary Evidence

In its previous decision certifying the class, the Court found that the fuel surcharge programs applied before the class period were "nothing like the widespread and uniform application of standardized fuel surcharges during the class period." Rail Freight III, 287 F.R.D. at 48. Specifically, the Court found that (1) the fuel surcharges applied during the Class Period were more aggressive and uniformly applied across virtually all shippers, id. at 49, (2) "each defendant enforced strict policies ensuring across-the-board application of these standardized fuel surcharge programs on all of their shippers," id. at 50, and (3) "any deviations from the standard fuel surcharge program were rare and without consequence for the purposes of determining injury-in-fact at trial with common evidence." Id. at 52. According to defendants, these findings — that fuel surcharges were more aggressive, were non-negotiable, and were uniformly applied — were "the glue" that allowed the Court to conclude that there was a class-wide answer to the question of why, and if, a shipper paid an allegedly conspiratorial fuel surcharge. Class Certification Hr'g Tr. (Sept. 27, 2016) at 254; see also Wal-Mart Stores, Inc. v. Dukes, 564 U.S. at 352 (emphasis in original) ("Without some glue holding the alleged reasons

for all those decisions together, it will be impossible to say that examination of all the class members' claims for relief will produce a common answer to the crucial question why was I [injured]."). On remand, defendants argue that after further expert discovery, the record no longer supports the Court's previous findings and conclusions. See Class Certification Hr'g Tr. (Sept. 26, 2016) at 152-53; Defs. Supp. Opp. at 59-60.

The documentary record in this case has not changed. On remand, plaintiffs again present substantial documentary evidence that indicates that defendants (1) created new, aggressive fuel surcharge formulas for carload traffic; (2) intended to apply their fuel surcharge programs as widely as possible to all or virtually all of their customers through new policies; and (3) viewed their fuel surcharge programs as profit centers.

The documentary evidence shows that before the class period, defendants had difficulty applying and enforcing fuel surcharges in contracts. The (now retired) manager of NS's pricing systems acknowledged that fuel surcharges were only "theoretically billable" from 2001 to 2002, the years preceding the alleged conspiracy. HD Ex. 65, Glennon Dep. (July 20, 2010) at 26; see also HD Ex. 66, Young Dep. (Aug. 4, 2010) at 225-26 (UP chief executive officer stating that before the class period "[w]e had fuel surge (sic) programs in many contracts, but because fuel had not run up, they were never implemented"); HD Ex. 70, Knight Dep. (July 9, 2010) at 24 (UP chief financial officer stating that during the 2000 through 2002 time period, UP did not have a company-wide policy on fuel surcharges: "[t]here were some isolated situations where there were surcharges, but . . . no policy position"). Furthermore, before the class period, defendants recognized the risk in applying fuel surcharges on their customers when their competitors did not. As BNSF noted in a 2002 internal report, "[t]he trucking industry uses fuel surcharges but our rail competitors do not and we therefore are hard pressed to achieve it.

We do loose [sic] business because of that and we may have to lower margin in other aspects in order to keep the business with the surcharges where we do apply it." TD Ex. 55, Enterprise Wide Risk Assessment (May 28, 2002), at BNSF-0574624_011; see also TD Ex. 57, Internal Memorandum from Chuck Schultz to Matt Rose (Jan. 15, 2003), at BNSF-0328866 ("[A]ny increase in fuel surcharges would result in a decrease in prices of the same amount in order to remain competitive.").

The fuel surcharges that defendants put in place for carload traffic in the spring of 2003 were different. The evidence shows that defendants employed these fuel surcharges in lockstep, lowered the trigger price for the imposition of the fuel surcharge, and adjusted the fuel surcharge based on the 30-day average fuel price — rather than only when the trigger was exceeded for 30 (or more) consecutive days. See Rausser Merits Rep. at 103-04, 118-27, 129 n.354. Defendants' own executives admitted that the new fuel surcharges applied to carload traffic were "more aggressive" and "yielded more revenue." HD Ex. 65, Glennon Dep. (July 20, 2010) at 42. Patrick Glennon, then manager of NS's pricing systems, described the new program in an internal NS e-mail: "By dropping the base to $23 per barrel, raising the percentage yield and [taking] it sooner, the change is in fact a blatant general rate increase, and will appear so to customers." HD Ex. 30, E-mail from Pat Glennon, to Don Seale (Apr. 29, 2003, 5:42 PM), at NS_010004522. A CSX executive similarly stated that although CSX's new fuel surcharge program may "seem[] somewhat benevolent, it is actually a large increase in fuel surcharge billings — maybe as much as 100%." RD Ex. 23, E-mail from John Couch (Mar. 19, 2003, 1:10 PM), at CSXFSC000000357.

During the class period, defendants also sought to apply fuel surcharges to as many customers as possible. As of January 2004, BNSF pricing guidelines stated: "Every

Contract should include a fuel surcharge clause. All new and all renewing contract negotiations should have a fuel surcharge as the goal." RD Ex. 223, BNSF Price and Fuel Escalation General Guidelines (Jan. 2004), at BNSF-0404221; see also HD Ex. 76, Jacobowski Dep. (Aug. 12, 2010) at 23. And BNSF internal e-mails emphasized that contracts requiring the chief executive officer's signature "but excluding full fuel surcharge provisions [would] not be signed." RD Ex. 224, E-mail from Sam Kyei, to John P. Lanigan (Mar. 11, 2004, 6:24 PM), at BNSF-FSC 000488. NS's vice president of industrial products, David Lawson, acknowledged that "there was a policy [at NS] to apply the standard fuel surcharge to as many customers as possible." HD Ex. 83, Lawson Dep. (Aug. 5, 2010) at 38. Internal UP emails stated that "all contracts without fuel language will have fuel language upon renewal. This is a mandate by UP management." RD Ex. 72, E-mail from B. Denker, to Howard Kaplan (Dec. 22, 2003, 10:17 AM), at USM005663; see also RD Ex. 141, E-mail from Dean Piacente (June 5, 2006, 2:28 AM), at CSXFSC000086200 (noting that "any multiyear deals must include FSC in the out years" and "[t]he new price vehicle should incorporate [CSX's] FSC Program").

Defendants' executives also acknowledged that the new fuel surcharge programs were intended to generate revenue and were envisioned as profit centers. See, e.g., RD Ex. 90, E-mail from Kitty Volbrecht, to Rob Martinez (May 18, 2004, 8:48 AM), at NS_010027582 ("[I]t seems like all the Merchandise rev/car increases are coming from fuel surcharges."); RD Ex. 162, CSX Form 10-K, at 25 ("The primary components of the revenue gain were continued yield management and the Company's fuel surcharge program, which drove revenue per unit across all major markets."). An internal BNSF memorandum noted that the "Eastern Railroads [CSX and NS] have a 'profit-center' with their Fuel Surcharge Programs for the customers that participate[.]" TD Ex. 122, Fuel Surcharge — Comparison of Class I Programs (Mar. 27, 2006),

at BNSF-0691138. And, in 2004, one BNSF employee described the company's fuel surcharge program as "a revenue maximization program, not protection against fuel prices." TD Ex. 127, E-mail from David T. Burr, to Matthew W. Feldman (Jan. 2, 2004, 3:14 PM), at BNSF-0344944.

According to plaintiffs, NS saw fuel revenue for certain businesses grow exponentially "from about $11.6 million in 2002, to about $61.7 million, $208 million, $650 million, and $974 million in 2003, 2004, 2005, and 2006, respectively." Class Mem. at 42-43; see also RD Ex. 150, Fuel Surcharge Tracking Report, at 1. BNSF's annual fuel surcharge revenue increased from about $110.5 million in 2003, to about $357 million, $1.06 billion, and $1.7 billion in 2004, 2005, and 2006, respectively. See RD Ex. 99, Fuel Cost Recovery Analysis (Sept. 2004), at BNSF-0458203; RD Ex. 146, Fuel Cost Recovery Analysis (Dec. 4, 2006), at BNSF-0033701. UP increased commodity revenue from fuel surcharges from about $112 million in 2003, to about $330 million and $1 billion in 2004 and 2005, respectively. See RD Ex. 165, UP 2004 Form 10-K, at 16; RD Ex. 166, UP 2005 Form 10-K, at 20. And CSX increased its fuel surcharge revenue from $72 million in 2003, to roughly $201 million, $525 million, and $821 million, in 2004, 2005, and 2006, respectively. See RD Ex. 148, Fuel Surcharge Strategy Presentation (Feb. 14, 2007), at CSXFSC000182751.

Although the documentary record shows that defendants changed their carload formulas after the start of the alleged conspiracy and sought to aggressively enforce them, defendants' more nuanced analysis on remand demonstrates that this was not necessarily true with respect to intermodal traffic. The record shows that BNSF and NS set their intermodal fuel surcharge formulas well in advance of the class period and did not change them during the class period. It also shows that intermodal traffic was a very substantial portion of the class traffic — 42% of BNSF's traffic in 2004 and 33% of NS's traffic in 2006. See infra at 166-73.

Consequently, a large portion of class traffic moved under competitively negotiated formulas that did not change from 2001 through the end of the class period. Yet Dr. Rausser's damages model generates over $800 million in overcharges for intermodal shippers. See infra at 167. There is no reliable evidence or explanation in the documentary record or in the reports of any of plaintiffs' experts for such massive overcharges. This fatal flaw in plaintiffs' ability to prove class-wide injury with common evidence will be discussed in detail infra at 166-73.

ii. Coverage

In a separate argument, defendants assert that new work done by their experts further demonstrates that there was not "universal fuel surcharge coverage" with respect to all or virtually all shippers during the class period because (1) rate-based fuel surcharges were common before the start of the alleged conspiracy, refuting plaintiffs' assertions that a conspiracy among the railroads was necessary to overcome shipper resistance to fuel surcharges, Defs. Supp. Opp. at 59-60; and (2) transaction data show that shippers were able to obtain discounts from defendants' standard fuel surcharge rates. See Defs. Ex. 3 at 5. It therefore follows, they say, that individualized determinations are necessary to prove "whether particular class members would have agreed to a surcharge provision even without a purported conspiracy." Defs. Supp. Opp. at 58; see id. at 63-66.[31] The Court disagrees.

With respect to the first argument, Dr. Kalt studied "new pricing opportunities" beginning in January 2002 and during the class period. See Kalt Class Rep. ¶ 105 & Figure 21. He defines "new opportunities" as new contracts either from new traffic or renewals after old

[31] "Coverage," as it is used in this context, refers to the number of shippers covered by a fuel surcharge provision during the class period. See, e.g., Class Certification Hr'g Tr. (Sept. 27, 2016) at 364.

contracts expired. Class Certification Hr'g Tr. (Sept. 29, 2016) at 828-29. According to him, the new opportunities data "reject the theory that a conspiracy was needed to overcome mounting customer resistance to FSCs" because "every Defendant had included a revenue-based FSC in at least 60% of new pricing opportunities prior to March 2003." Kalt Class Rep. ¶ 105 & Figure 21. Based on these findings, Dr. Kalt asserts that individualized inquiry is needed to separate individuals who would have paid a fuel surcharge regardless of an alleged conspiracy from class members who were injured because of the conspiracy. See id. ¶ 107. The problem with Dr. Kalt's hypothesis is that his findings are inconsistent with the factual record, in which defendants' own executives described their fuel surcharge coverage prior to 2003 as low or minimal. See, e.g., HD Ex. 68, Lanigan Dep. (June 22, 2010) at 27 (BNSF executive vice president and chief marketing officer stating that BNSF's fuel surcharge participation rates in January 2003 were "low," in the "25 to 30 percent range"); HD Ex. 69, Gooden Dep. (July 16, 2010) at 101 (CSX executive vice president of sales and marketing agreeing that the "fuel surcharge revenue [CSX] was generating prior to adoption of this new program in March of 2003" was "[l]ow — relatively low to where it needed to be"); HD Ex. 71, McNulty Dep. (Aug. 10, 2010) at 118-19 (CSX director of marketing agricultural products discussing "fairly minimal" fuel surcharges in 2001 and 2002); HD Ex. 66, Young Dep. (Aug. 4, 2010) at 28 (UP chief executive officer agreeing that fuel surcharges triggered "during the 2000 through 2002 time period never reached significant percentage levels").

Dr. Kalt's new opportunities analysis is also unconvincing because these "new opportunities" represent only a fraction of defendants' standard fuel surcharge formulas and revenue. See Rausser Merits Reply at 181-82 & Table 74. Evidence that defendants were able to impose fuel surcharges on a small portion of their revenue and traffic prior to the start of the

alleged conspiracy does not refute the substantial factual record that defendants faced resistance in imposing such fuel surcharges at that time.

Second, defendants argue that the transaction data indicate that defendants never achieved universal or near-universal coverage with respect to carload traffic, in part because shippers were able to negotiate discounts. Defs. Supp. Opp. at 62; see also Kalt Class Rep., Figure 21. But Dr. Kalt's testimony that there was "substantial deviation" from defendants' standard carload formulas, showing that shippers were able to obtain discounts during the class period, Class Certification Hr'g Tr. (Sept. 29, 2016) at 827, is not supported by the documentary record. While defendants' transaction data indicate that a few shippers did not pay a fuel surcharge because they negotiated and obtained discounts from standard fuel surcharge formulas, the documentary record shows that there were only a relatively small number of shippers who paid non-standard fuel surcharge rates during the class period. Discounts were rare. Defendants' own statements indicate that there were only a few exceptions to defendants' policies to attempt to achieve across-the-board fuel surcharge coverage with respect to carload traffic. See, e.g., HD Ex. 21, E-mail from Pat Glennon (Apr. 14, 2005, 2:51 PM), at NS_007000489 ("There are relatively few [NS] publications with no FSC, nonstandard FSC or blends of FCSs."); HD Ex. 20, John Lanigan's Staff Meeting Notes (Apr. 11, 2006), at BNSF-0048723 (noting that there are "[v]irtually no exceptions" to fuel surcharge adherence and "business units have done an excellent job in [FSC] adherence"); HD Ex. 69, Gooden Dep. (July 16, 2010) at 191-92 (CSX executive vice president of sales and marketing stating that his goal was to have "zero exceptions" when applying fuel surcharges to contracts, and that only a small number of exceptions were granted to shippers); HD Ex. 82, Kraemer Dep. (Aug. 11, 2010) at 30; HD Ex. 79, Garin Dep. (Aug. 16, 2010) at 67-68; HD Ex. 86, Cerwonka Dep. (Aug. 13, 2010) at 19-20.

In this context, the evidence proffered by defendants is not persuasive and does not preclude a finding of predominance.

Finally, Dr. Kalt faults Dr. Rausser for failing to develop a "coverage model" that would predict "whether an individual class member would have had a fuel surcharge but for the conspiracy." Class Certification Hr'g Tr. (Sept. 27, 2016) at 434; see also Kalt Class Rep. ¶¶ 103, 107. Without a model to predict coverage, defendants maintain, individualized inquiries are necessary to determine whether a shipper paid a fuel surcharge because of the alleged conspiracy. Defs. Supp. Opp. at 63-66. Dr. Rausser persuasively argues that there was no need to create a separate model for coverage:

> Rather than try to predict FSC coverage through a regression analysis, [he has] properly sought to determine whether all-in rates paid by Class members in the Class Period were elevated, when compared with the pre-Class period, to a degree that the usual determinants of freight rates, including fuel costs, could not explain. That model is well matched to the alleged conspiracy and the discovery record.

Rausser Supp. Reply at 38; see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 433-34.

The Court accepts Dr. Rausser's explanation as to why his model uses defendants' actual level of fuel surcharge use during the Class Period in his damages model and agrees with him as to why a coverage model is not necessary as common evidence of injury-in-fact to support predominance. Rausser Supp. Reply at 37. Dr. Rausser's regression models "give rise to an inference of causation (the most any regression analysis can be expected to do)." Rail Freight III, 287 F.R.D. at 68 (emphasis added); see also Morgan v. United Parcel Serv. of Am., Inc., 380 F.3d 459, 466 (8th Cir. 2004) (stating that a valid regression model gives rise to an inference of causation, but does not by itself prove causation); Rubinfeld, supra, at 310

("[O]ne must infer that a causal relationship exists on the basis of an underlying casual theory that explains the relationship between the two variables.").

b. Defendants' Challenges to Dr. Rausser's Common Factors and Damages Models

The Court next discusses four specific challenges made by defendants to Dr. Rausser's regression models and explains why the Court finds them unconvincing. First, the Court discusses why it finds Dr. Rausser's common factors model to be reliable in explaining variations in rail freight pricing and in helping to demonstrate class-wide impact. Second, the Court addresses defendants' argument that Dr. Rausser should have used a variable fuel coefficient rather than a constant fuel coefficient in his damages model, and explains why the constant fuel coefficient does not "rig" the damages model to find overcharges. Third, the Court deals with Dr. Kalt's structural break analyses and explains why they do not undermine the reliability of Dr. Rausser's damages model. And fourth, the Court addresses Dr. Kalt's critique that Dr. Rausser's damages model is prone to certain "false positives," other than the one highlighted by the court of appeals, and concludes that Dr. Kalt's exercises do not show that Dr. Rausser's model generates false positives.

i. Dr. Rausser's Common Factors Model

Dr. Rausser developed two economic regression models: a common factors model and a damages model. According to plaintiffs and Dr. Rausser, "[t]hese models together show that there are identifiable common factors that explain pricing in the rail freight industry; and . . . that conspiracy caused significant overcharges across the proposed class." Class Certification Hr'g Tr. (Oct. 6, 2010) at 137. The Court previously concluded that both models were essential to proving common impact, Rail Freight III, 287 F.R.D. at 69, and the D.C.

Circuit agreed. In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 253.

Through his common factors analysis, Dr. Rausser determined that there are seven common factors that predominate in defendants' rail freight pricing. Rausser Merits Rep. at 113. These common factors are: (1) weight of cargo, (2) distance traveled, (3) interline or non-interline, (4) route taken, (5) commodity type, (6) car type, and (7) timing/seasonality. See Pls. Ex. 1 at 8; Rausser Merits Rep., Table 52. Dr. Rausser notes that his common factors model explains 75% of the variation in rail freight prices, which is "high explanatory power." See Class Certification Hr'g Tr. (Sept. 27, 2016) at 366; Rausser Merits Rep. at 160. Based on this analysis, Dr. Rausser concluded that these seven factors predominate in defendants' pricing of rail freight services and that "it is possible for a regression model to control for factors that determine freight rates in assessing what portion of the higher prices observed in the Class Period are attributable to the alleged conspiracy." Rausser Merits Rep. at 113.

Defendants offer two principal critiques of Dr. Rausser's common factors model. First, they maintain that Dr. Rausser omits key variables from his common factors analysis. Defs. Supp. Opp. at 78. And second, defendants argue that the common factors model does not show evidence of common impact. See Class Certification Hr'g Tr. (Sept. 30, 2016) at 1185-86. The Court addresses each critique in turn.

According to defendants, Dr. Rausser omits key variables in his common factors analysis — namely, any variable regarding fuel surcharges. Defs. Supp. Opp. at 78. Defendants argue that Dr. Rausser should have included at least the following additional variables: (1) whether the shipper paid a fuel surcharge and the amount it paid; (2) any contract terms, such as a fuel surcharge provision; (3) whether there was non-rail competition for the shipper,

(4) whether the putative class member was a captive shipper; (5) whether a particular shipment had any special requirements; and (6) the effect of changes in demand on particular routes or commodities. Id. Beyond the assertion that Dr. Rausser should have included these variables, defendants do not offer persuasive analysis on why or how these variables more accurately explain the variation in rail freight pricing and why they must be included in his common factors analysis. Although Dr. Leitzinger did not conduct an independent common factors analysis, he testified that after reviewing Dr. Rausser's work he concluded that the common factors regression analysis was appropriately designed for its purpose. Class Certification Hr'g Tr. (Sept. 28, 2016) at 682. The Court agrees with Dr. Leitzinger that "[s]imply noting the theoretical possibility of sample design issues, without providing more analysis or evidence, does not undermine the reasonableness or reliability of Dr. Rausser's findings." Leitzinger Rep. ¶ 72.

The Court is not persuaded by defendants' arguments that Dr. Rausser omitted key variables in his common factors model, particularly in light of the model's purpose — to explain variation in rail freight pricing. The common factors model includes the logical determinates of freight rates, and, as Dr. Rausser notes, each of the seven variables he identified has a "statistically significant effect on price." Rausser Merits Rep. at 160. The Court concludes that defendants have failed to undermine plaintiffs' showing that the seven variables identified and controlled for in Dr. Rausser's analysis are the determinative factors in rail freight pricing.

Second, defendants argue that the common factors model does not show common impact, or, more appropriately, that Dr. Rausser's common factors model cannot be used as evidence of common impact. See Class Certification Hr'g Tr. (Sept. 30, 2016) at 1181-86. As noted, Dr. Rausser does not assert that the common factors analysis alone demonstrates common impact or explains whether or why a shipper paid a fuel surcharge. See supra at 40-41.

According to Dr. Kalt, because certain factors, such as mileage or weight, affect rail prices differently, these factors are common — in the sense that they affect prices — but they do not show common impact. Class Certification Hr'g Tr. (Sept. 29, 2016) at 868-69. Dr. Rausser's seven factors, defendants argue, are differentiating factors rather than common factors. See Class Certification Hr'g Tr. (Sept. 30, 2016) at 1185. Defendants and Dr. Kalt, however, offer no persuasive authority as to why a common factors analysis — often used to explain pricing in complex industries — must show that each factor affects prices in the same exact way. It is logical that certain variables affect prices to a different degree, but the point of Dr. Rausser's common factors analysis is to discern which factors predominate in rail freight pricing and control for those factors in his damages model. To suggest that each factor must affect prices in the exact same way would undermine the use of common factors analyses, which are frequently accepted by courts to explain variation in pricing in complex industries. See, e.g., In re Processed Egg Prods. Antitrust Litig., 312 F.R.D. at 188, 190-91; In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1218-19. The Court therefore concludes that defendants' arguments do not undermine Dr. Rausser's common factors model.

ii. Constant Fuel Coefficient: Whether Dr. Rausser's Damages Model is "Rigged" to Find Overcharges

On remand, defendants and their experts have presented a new argument: that Dr. Rausser's damages model is not a reliable means of proving class-wide impact and damages because the model is "rigged" to find overcharges whenever fuel prices rise faster than other costs. See Defs. Supp. Opp. at 32-33; Class Certification Hr'g Tr. (Sept. 26, 2016) at 172-73. The model is rigged, defendants assert, because Dr. Rausser uses a constant fuel coefficient in his damages model, rather than a variable coefficient. Defs. Supp. Opp. at 32-33; see also Defs.

Sur-Reply at 3 (arguing that the constant fuel coefficient "hard-wires Dr. Rausser's model to find damages when fuel costs are high").

Dr. Rausser's damages model uses a benchmark comparison between a period before the alleged conspiracy occurred ("benchmark period") and a period affected by the alleged conspiracy ("class period"). Rausser Supp. Reply at 22. Dr. Rausser incorporates into his damages model a coefficient for fuel price elasticity, which he calculates as 0.103. Id. at 44-45. Using STB data from 1999 to 2008, Dr. Rausser constructed a regression model to determine the elasticity relationship between fuel prices and variable costs. He determined that the elasticity relationship between fuel prices and variable costs was 0.103, meaning "that a 100% increase in fuel costs would be associated with a 10.3% increase in variable costs per ton-mile." Id. Once he calculated the 0.103 coefficient, he kept it constant in his damages model. See id. at 23. Defendants vigorously dispute Dr. Rausser's use of a constant fuel coefficient rather than a variable coefficient in his model.[32]

Defendants argue that basic mathematics and common sense illustrate why Dr. Rausser's choice to keep fuel price elasticity constant in his damages model is incorrect and undermines its reliability. Defs. Supp. Opp. at 35-37; see also Kalt Class Rep. ¶¶ 13, 50. They assert that fuel price elasticity must increase as fuel prices go up and fuel becomes a larger share

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[32] In addition to disputing whether Dr. Rausser should have used a constant or a variable fuel coefficient in his damages model, defendants also dispute what value the fuel price elasticity should be if the fuel price coefficient is held constant. Kalt Class Rep. ¶ 59. Dr. Kalt calculates a different fuel price elasticity by excluding all of the STB intermodal data from the calculation. See id.; Rausser Supp. Reply at 51. Dr. Kalt calculates a higher fuel price elasticity of 0.222, which would result in lower overcharges. Kalt Class Rep. ¶¶ 59-60. In calculating his 0.222 elasticity, Dr. Kalt uses evidence common to the class. A dispute over the correct value of the fuel price elasticity therefore is a merits question beyond the scope of class certification. See In re Processed Egg Prods. Antitrust Litig., 312 F.R.D. at 195-96; In re Ethylene Propylene Diene Monomer (EPDM) Antitrust Litig., 256 F.R.D. at 90; In re Lidoderm Antitrust Litig., No. 14-2521, 2017 WL 679367, at *12, 17 (N.D. Cal. Feb. 21, 2017).

of a railroad's costs. Defs. Supp. Opp. at 35. They argue that if one builds into the model the unfounded assumption that fuel prices remained the same when in fact they rose dramatically, "[y]ou're going to get damages throughout the Class Period." Class Certification Hr'g Tr. (Sept. 27, 2016) at 225-26. To illustrate how fuel price elasticity changed during the class period, defendants note that Dr. Rausser included the pre-class period with particularly low fuel prices and therefore calculated low average elasticity (0.103) when in fact the fuel price elasticity for just the class period years, 2003-2008, was higher (0.27). Id. at 228-29; see also Rausser Supp. Reply, Figure 4. Defendants argue that keeping the fuel price elasticity constant in the damages model creates an effect that a change in fuel prices always results in the same change in the but-for all-in rate, even as fuel prices increased during the class period. See Kalt Class Rep. ¶¶ 10-13. Essentially, Dr. Rausser "estimates [the] fuel price coefficient using low fuel prices, or by averaging low and high fuel prices, and then applies this same fuel price coefficient to the Class Period with its unprecedented, high fuel prices." Defs. Supp. Opp. at 32-33.

Plaintiffs and their experts present numerous, sometimes highly technical arguments about why Dr. Rausser's use of a constant fuel coefficient in his damages model is appropriate. See, e.g., Rausser Supp. Reply at 69; Class Certification Hr'g Tr. (Sept. 28, 2016) at 636-37 (Dr. McClave), 691-92 (Dr. Leitzinger). Dr. Kalt and Dr. Carlton, in contrast, maintain that use of a constant fuel coefficient is inappropriate because it leads the model to generate damages even when freight rates increase merely to reflect higher fuel costs. See, e.g., Kalt Class Rep. ¶ 51; Class Certification Hr'g Tr. (Sept. 29, 2016) at 856-57 (Dr. Kalt); Carlton Rep. ¶ 6.[33] According to Dr. Carlton, the use of a constant fuel coefficient "renders

[33] The parties also dispute whether five independent studies cited by Dr. Rausser support or reject Dr. Rausser's use of a constant fuel coefficient. Compare Defs. Supp. Opp. at 37, and Carlton Rep. ¶ 20, with Rausser Supp. Reply at 64, and Leitzinger Rep. ¶ 186. The

[Dr. Rausser's damages] model unreliable." Carlton Rep. ¶ 18. For the purposes of class certification, the Court therefore must determine whether Dr. Rausser's use of a constant, as opposed to a variable, fuel coefficient in his damages model undermines the reliability of the model.

To remind, fuel price elasticity measures the relationship between fuel prices and a railroad's variable costs. Rausser Supp. Reply at 44-45. Defendants' arguments therefore seem intuitive: fuel price elasticity should increase as fuel prices (and fuel costs) increased during the class period. Use of a constant fuel coefficient in the model "is acting like fuel is cheaper than it is," which creates "a false appearance of injury throughout" the class period. Class Certification Hr'g Tr. (Sept. 30, 2016) at 1199. Defendants' argument, however, assumes that defendants could pass through all fuel costs as rates increased. See Kalt Class Rep. ¶¶ 13, 49-50. But as plaintiffs note, defendants generally are not able to pass through all of their increased costs to their customers. Pls. Supp. Reply at 16; see also AREEDA ET AL., supra, ¶ 395b1 (noting that "cost increases are not usually passed on in their entirety"). Furthermore, as previously discussed, holding coefficients constant is standard econometric practice when using log-log models. See supra at 44-45, 48. Thus, whether it was appropriate for Dr. Rausser to use a constant fuel coefficient is not as simple a question as defendants and their experts suggest.

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defense experts are correct that none of the studies cited by Dr. Rausser bears on the propriety of using a constant elasticity when estimating overcharges. See Kalt Class Sur-Reply ¶¶ 13-16; Carlton Rep. ¶ 20. But that is largely beside the point. These studies give no indication of whether it is possible to estimate overcharges reliably and accurately in an antitrust case using a variable fuel price elasticity. Given that these independent studies discussed by both parties do not directly speak to the issues in this case, the Court concludes that these studies neither support nor undermine the reliability of Dr. Rausser's damages model and his use of a constant fuel coefficient.

To respond to defendants' arguments that he should have used a variable fuel coefficient instead of a constant one, Dr. Rausser calculated a variable fuel elasticity for the damages model. Rausser Supp. Reply at 69. Dr. Rausser determined that:

> The resulting elasticity measure is negative or hovers around zero until half way through 2004, when [the elasticity then] increases to as high as 0.45 in the summer of 2008 (despite the fact that fuel prices were never higher than 0.35 of costs, even for the western railroads [BNSF and UP], and never higher than 0.25 of costs for the eastern railroads [CSX and NS]).

Id. A negative fuel price elasticity would suggest that as fuel costs increase, variable costs would decrease. See id. at 44-45. Dr. Rausser concluded that these "results [did] not make economic sense" and that the use of a constant fuel price elasticity made the model more reliable than the use of variable elasticity. Id. at 69.

While Dr. Kalt tried to explain why the fuel price coefficient should not be held constant, see Kalt Class Rep. ¶¶ 49-52; Defs. Ex. 3 at 16-17, he did not submit any analysis of his own to attempt to demonstrate how Dr. Rausser's damages model could incorporate a variable fuel coefficient. He did not report any analysis running a model using variable elasticities. See Rausser Supp. Reply at 69. And he did not suggest any particular model specification "with which one could meaningfully and reliably incorporate a constantly changing fuel price-freight rate elasticity." McClave Supp. Rep. at 15.

Defendants' other expert, Dr. Carlton does provide a glimpse at whether one can reliably incorporate a variable fuel coefficient in Dr. Rausser's damages model. Dr. Carlton opines that "fuel price elasticity can be treated as being approximately equal to the fuel share of variable cost" based on a concept known as Shephard's Lemma. Carlton Rep. ¶ 23; see Class Certification Hr'g Tr. (Sept. 30, 2016) at 1027-28. Fuel shares therefore can "provide an independent measure of the fuel price elasticity but-for the conspiracy . . . [to] test the

reasonableness of [Dr.] Rausser's estimated constant non-conspiratorial fuel price elasticity." Carlton Rep. ¶ 23. By running Dr. Rausser's model using the fuel shares as the fuel price coefficient — that is, a variable coefficient — Dr. Carlton attempts to test how Dr. Rausser's damages model responds using a nonconstant fuel coefficient.

Dr. Carlton started with an analysis undertaken by Dr. Leitzinger to test Dr. Rausser's methodology, in which Dr. Leitzinger calculated annual fuel price shares from 1999 to 2008. See supra at 88-90. Dr. Leitzinger calculated two sets of fuel shares, one set published in his expert report and another set produced prior to his deposition. See Class Certification Hr'g Tr. (Sept. 29, 2016) at 790-91. When Dr. Carlton ran Dr. Rausser's damages model with Dr. Leitzinger's fuel shares as variable elasticities, Dr. Carlton estimated an average overcharge of -26.2% using Dr. Leitzinger's expert report fuel shares, and a 3.2% average overcharge using the revised deposition fuel shares. Carlton Rep. ¶¶ 30 n.49, 38 & Table 5. Dr. Carlton concludes that his results indicate that "[w]hat you put in for those fuel price elasticities has an enormous effect on what damages are" and demonstrate that Dr. Rausser's damages model, with a constant fuel price elasticity, "is not very reliable." Class Certification Hr'g Tr. (Sept. 30, 2016) at 1044; see also Carlton Rep. ¶ 38.

The Court finds Dr. Carlton's fuel shares criticism of the constant fuel coefficient unpersuasive for two reasons: (1) the assumption on which Dr. Carlton's work is based — that fuel price shares should equal fuel price elasticity — is inappropriate, and (2) the results from Dr. Carlton's fuel shares analysis generate incorrect signs — that is, signs that are inconsistent with economic theory — thereby undermining the reliability of his results.

First, Dr. Carlton's fuel shares exercise hinges on the assumption, based on Shephard's Lemma, that fuel price shares should equal fuel price elasticity. See Class

Certification Hr'g Tr. (Sept. 28, 2016) at 716-17. But the theory of Shephard's Lemma is inconsistent with the reality of the freight rail industry. Id. at 717. As Dr. Rausser testified, there is no indication that defendants ever satisfied or could satisfy Shephard's Lemma: "[t]here's not a shred of evidence" that this is true in the railroad industry; indeed, he says, most industries have not been able to satisfy Shephard's Lemma. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 393. Furthermore, as Dr. Leitzinger notes, fuel price shares would not necessarily equal fuel price elasticity in this case because the defendant railroads purchase their fuel at less than published prices by, among other things, engaging in fuel price hedging strategies, which "cause their fuel costs to not be the same as fuel prices." Class Certification Hr'g Tr. (Sept. 28, 2016) at 717. Fuel price hedging is where one agrees to purchase fuel at a fixed price far in advance, in order to protect oneself from future price volatility. Leitzinger Rep. ¶ 34 & n.88. Increases in the fuel price index therefore do not increase defendants' fuel costs right away. Class Certification Hr'g Tr. (Sept. 28, 2016) at 717-18. Because Dr. Carlton's criticism rests on an assumption inconsistent with the facts in this case, the Court finds it an unreliable basis on which to conclude that Dr. Rausser's damages model is flawed.

Second, as Dr. McClave testified at the class certification hearing, when he analyzed Dr. Carlton's exercises he found that 15 of the 21 models run by Dr. Carlton had signs that are inconsistent with economic theory — that is, "a different sign than expected, a positive when a negative is expected or a negative when a positive is expected." Class Certification Hr'g Tr. (Sept. 28, 2016) at 647. And each of these 21 models "used some version of variable elasticities, fuel elasticities, that were based on fuel shares." Id. at 646. For example, 15 of the tests included signs such as (1) negative GDP, indicating that as demand goes up, prices go down; (2) negative other costs elasticity, indicating that as other variable costs increase, prices

decrease; and (3) negative fuel interaction, indicating that as fuel prices increase, freight rates go down. See id. at 647-48; Pls. Ex. 2 at 22-23. As Dr. McClave testified, "none of these is consistent with economic theory, basic economic theory." Class Certification Hr'g Tr. (Sept. 28, 2016) at 648. Based on these results, Dr. McClave concluded that it is "not appropriate to use a varying elasticity, at least the way [Dr. Carlton has] done it." Id. at 650.

The Court agrees. These counterintuitive results undercut the reliability of Dr. Carlton's work and his criticism of Dr. Rausser's damages model. Rather than showing that Dr. Rausser's damages model should incorporate a variable fuel coefficient, Dr. Carlton's exercise confirms Dr. Rausser's conclusion — that the use of a constant fuel price coefficient produces a more reliable model. See Rausser Supp. Reply at 69. Given the incorrect assumption on which Dr. Carlton's fuel shares analysis is based and the incorrect signs produced in his results, the Court concludes that Dr. Carlton's fuel shares analysis does not undermine Dr. Rausser's damages model and its use of a constant fuel coefficient.

Another aspect of the criticism of Dr. Rausser's use of a constant fuel coefficient is the issue of fuel pass through. Defendants and their experts argue that the use of a constant fuel coefficient does not allow defendants ordinary fuel cost recovery as fuel costs increased during the class period. See Defs. Supp. Opp. at 35; Kalt Class Sur-Reply ¶¶ 6-9. Dr. Rausser testified that his damages model assumes that defendants recovered 100% of their actual fuel costs during the class period. Class Certification Hr'g Tr. (Sept. 27, 2016) at 393; see also id. at 312 (plaintiffs' counsel noting that Dr. Rausser's damages model assumes that "defendants are going to be able to pass through 100 percent of their variable costs into the freight rate"). Dr. Leitzinger noted that this assumption was "conservative" — meaning that the model actually may underestimate overcharges — because the railroads typically do not pass through all of their

increased costs to their customers. Leitzinger Rep. ¶ 116; see also AREEDA ET AL., supra, ¶ 395b1 (noting that "cost increases are not usually passed on in their entirety"). He testified that defendants likely would have passed through (or recovered) only 80 percent of their increased fuel costs. See Class Certification Hr'g Tr. (Sept. 28, 2016) at 706; Leitzinger Rep. ¶ 191.

Regardless of Dr. Rausser's assertion that the damages model allows for 100% fuel cost recovery, Dr. Carlton maintains that Dr. Rausser's damages model still does not allow defendants to pass through enough of their fuel costs during the class period, particularly when fuel prices were at their peak. See Carlton Rep. ¶ 44. According to Dr. Carlton:

> In the years when fuel prices were highest (in 2006-2008, when they exceeded $2.50 per gallon), the pass-through rates implied by [Dr.] Rausser's STB Model are low: 0.39 in 2006, 0.15 in 2007, and 0.50 in 2008. This means that, in 2007, for example, [Dr.] Rausser's damages model allows a railroad to pass-through to shippers in the form of higher rail rates only $0.15 for every dollar increase in its fuel cost per ton mile.

Id. ¶ 42. Dr. Carlton concludes that the low pass-through rates near the end of the class period implied by Dr. Rausser's damages model "are another consequence of [Dr. Rausser's] constant fuel price elasticity assumption" and explain why Dr. Rausser's model finds the largest percentage of damages — 84% of damages — in the last three years of the class period when fuel prices were at their highest. Carlton Rep. ¶ 44; see also Class Certification Hr'g Tr. (Sept. 30, 2016) at 1047-49. Dr. Carlton concludes that the use of a constant fuel coefficient in Dr. Rausser's damages model "allows pass-through rates (but-for the conspiracy) that are implausibly low when fuel costs are high." Carlton Rep. ¶ 44.

Plaintiffs argue that Dr. Carlton's pass-through opinions cannot be reconciled with defendants' executives' own statements from the record, and the Court agrees. Class Certification Hr'g Tr. (Sept. 30, 2016) at 1240; Pls. Supp. Reply at 19-20. Indeed, there is no

indication from the factual record that defendants had difficulty in recovering their increased fuel costs during the class period; in fact, the record indicates just the opposite. The statements of defendants' executives demonstrate that they believed their fuel surcharge programs over-recovered their increased fuel costs during the alleged conspiracy. In 2004, one BNSF employee described the company's fuel surcharge program as "a revenue maximization program, not protection against fuel prices." TD Ex. 127, E-mail from David T. Burr, to Matthew W. Feldman (Jan. 2, 2004, 3:14 PM), at BNSF-0344944. A UP executive similarly noted that UP senior finance management held the position that the proposed fuel surcharge was "not some 'trying to make whole' value," and other UP employees saw "nothing wrong with recovering at a rate greater than 100%." TD Ex. 126, E-mail from Mark J. Draper, to Mary E. McArdle (Aug. 2, 2005, 8:01 AM), at UPFSC 0066571; see also TD Ex. 123, E-mail from Erik Palm (June 3, 2004, 9:34 AM), at CSXFSC000086525 ("If we had 100% fuel surcharge coverage, we would actually be recovering twice the incremental fuel expense above the surcharge trigger point."). Based on the contemporaneous statements of defendants' executives, the Court is not persuaded by defendants' arguments that the constant fuel coefficient is unreliable because it does not permit them ordinary fuel cost recovery.

Although the parties' experts have demonstrated how fuel price elasticity changed from year-to-year during the class period, the Court sees no support on this record that a damages model can be run reliably and accurately using a variable fuel price elasticity. Dr. Rausser and Dr. McClave have both shown that it cannot. See Rausser Supp. Reply at 69; Class Certification Hr'g Tr. (Sept. 28, 2016) at 645-50. Dr. Carlton's attempts to run the damages model using fuel shares as variable fuel price elasticities produce results inconsistent with basic economic theory. Furthermore, the Court agrees with plaintiffs that defendants'

argument that Dr. Rausser's damages model does not permit defendants sufficient fuel cost recovery cannot be reconciled with the factual record. See Class Certification Hr'g Tr. (Sept. 30, 2016) at 1240. The Court therefore concludes that plaintiffs have shown by a preponderance of the evidence that the use of a constant fuel coefficient in Dr. Rausser's damages model is a reliable method for attempting to prove class-wide impact.

iii. Structural Break Analyses: Whether Dr. Rausser's Damages Model Shows Structural Breaks and Overcharges Throughout the Pre-Class and Class Periods

Dr. Rausser has opined that his damages model reveals "a structural break in the relationship between fuel prices and freight rates, coincidental with the start of the [alleged] conspiracy." Rausser Merits Rep. at 170. According to Dr. Rausser, "[s]uch a break is consistent with the existence of collusive behavior in the Class Period, in contrast to prior non-collusive behavioral patterns." Id. at 7. "In the absence of an intervening event," he maintains, "such as an agreement among the Defendants as alleged by Plaintiffs, the historical relationship between freight rates and fuel prices would generally be expected to continue." Id. Dr. McClave replicated Dr. Rausser's structural break regression analysis and concluded "that it was accurately done." Class Certification Hr'g Tr. (Sept. 28, 2016) at 598.

On remand, Dr. Kalt offers two structural break analyses, which, he asserts, demonstrate that Dr. Rausser's damages model is unreliable. The goal of these exercises was to test Dr. Rausser's hypothesis that the data reveal no intervening event other than the conspiracy and to examine whether the structural break that Dr. Rausser finds in the data is the result of the alleged conspiracy. See Class Certification Hr'g Tr. (Sept. 29, 2016) at 844. Dr. Kalt first conducted a structural break analysis on the full pre-class and class period data (2000-2008), and then conducted a structural break analysis on only the pre-class period data (2000-2003). Kalt

Class Rep. ¶¶ 40-42.[34] Dr. Kalt determined that Dr. Rausser's damages model yields structural breaks throughout the pre-class and class periods — not just at the start of the alleged conspiracy, as Dr. Rausser posits. Id. at ¶¶ 40-42 & Figures 4, 5; see also Defs. Ex. 3 at 13-1-13-5. Dr. Kalt also finds significant overcharges at each interval where he finds a structural break, including during the pre-class period. See Kalt Class Rep., Figures 4, 5. From these analyses, Dr. Kalt concluded that Dr. Rausser's damages model "cannot identify when the alleged conspiracy began or isolate or measure damages attributable to the Defendants' alleged unlawful conduct." Id. ¶ 42. Plaintiffs argue that both of Dr. Kalt's analyses are unreliable and therefore do not undermine the results of Dr. Rausser's damages model.

1. Dr. Kalt's full structural break analysis does not undermine Dr. Rausser's damages model. Plaintiffs' experts, Dr. Rausser and Dr. McClave, find fault with the composition of Dr. Kalt's full structural break analysis. When Dr. Kalt changes the class period dates in his analysis to create the pseudo pre-class and pseudo class periods, he is always incorporating some portion of the actual class period in his pseudo pre-class period. Rausser Supp. Reply at 87. According to Dr. Rausser, Dr. Kalt found structural breaks throughout the class period because "in using the [data from] the full period 2000-2008, he always compared some portion of the pre-Class Period to some portion of the Class Period, thereby incorporating the effect of the conspiracy." Id.; see also McClave Merits Rep. at 11-12.

The Court finds Dr. Kalt's full structural break analysis unconvincing. As plaintiffs and their experts note, the manner in which Dr. Kalt breaks up his pseudo pre-class

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[34] As previously noted, supra at 74, Dr. Kalt's structural break analyses use two novel terms — pseudo pre-class period and pseudo class period — which refer to the revised periods that, under a structural break exercise, result when one changes the start of the class period.

periods and pseudo class periods in his tests means that he always compares some portion of the actual pre-class period to the actual class period, thereby capturing some effect of the alleged conspiracy in each test. It therefore is "no surprise" that Dr. Kalt's analysis finds structural breaks at each six month interval between 2000 and 2008. McClave Merits Rep. at 11. The Court concludes that Dr. Kalt's full structural break analysis does not undermine the results of Dr. Rausser's damages model.

2. Dr. Kalt's pre-class structural break analysis is unreliable and therefore does not undermine the reliability of Dr. Rausser's damages model. Because of plaintiffs' criticisms of his full structural break analysis, Dr. Kalt then ran his structural break analysis on only the pre-class period so that his results could not be affected by the alleged conspiracy. See Kalt Class Rep. ¶¶ 41-42 & Figure 5. Running the structural break analysis on only the pre-class period data, Dr. Kalt found that Dr. Rausser's damages model produces structural breaks and overcharges at every single quarter between April 1, 2000, and January 1, 2003. See Defs. Ex. 3 at 12; Kalt Class Rep. ¶ 41 & Figure 5 (noting overcharges in the pre-class period ranging from 2.3% to 7.5%). Dr. Kalt characterizes these results as false positives because, as he sees it, the damages model "is always finding structural breaks and evidence of overcharges, even in a period where nothing in the case or in the claims says we should find overcharges and structural breaks." Class Certification Hr'g Tr. (Sept. 29, 2016) at 843; see also Kalt Class Rep. ¶ 9. Dr. Kalt concludes that Dr. Rausser's model arbitrarily ascribes the July 2003 structural break to the conspiracy when it is really Dr. Rausser's inappropriate data construction — using all transactions in the pre-class period and only those with fuel surcharges in the class period — that cause the break. Kalt Class Rep. ¶¶ 41-42 & Figure 5; Kalt Class Sur-Reply ¶ 44 & n.83.

Plaintiffs and their experts argue that Dr. Kalt's pre-class structural break analysis does not undermine Dr. Rausser's damages model any more than his full structural break analysis did. They maintain that Dr. Kalt's analysis is fundamentally flawed for three reasons. First, the composition of Dr. Kalt's pre-class structural break analysis is inappropriate because it used all transactions in the pseudo pre-class periods and only transactions paying fuel surcharges in the pseudo class period. See Rausser Supp. Reply at 88, 90-94. Second, the results of Dr. Kalt's pre-class structural break analysis are unreliable because the results include a wrong sign on a significant variable — the diesel fuel indicator variable. See id. at 90-91; McClave Supp. Rep. at 9-10. And third, Dr. Kalt's pre-class structural break analysis contains pseudo pre-class periods and pseudo class periods with too few data points from which to draw reliable, valid conclusions. Rausser Supp. Reply at 93-94.[35] The Court agrees with plaintiffs' experts that Dr. Kalt's pre-class structural break analysis is flawed and fails to demonstrate that Dr. Rausser's damages model is unreliable.

First, the Court agrees that it was inappropriate for Dr. Kalt to construct his pre-class structural break analysis using all shipments in his pseudo pre-class period and only transactions paying fuel surcharges ("FSCs") in his pseudo class period. For his actual damages

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[35] Plaintiffs' experts also argued that Dr. Kalt's structural break analyses are unreliable because Dr. Kalt did not have a maintained hypothesis for why he chose particular dates to create his pseudo pre-class and pseudo class periods. See Rausser Supp. Reply at 88; Class Certification Hr'g Tr. (Sept. 28, 2016) at 668-69. Dr. Rausser, on the other hand, chose July 1, 2003, to separate the pre-class and the class period in his damages model based on his review of the documentary record. The Court finds Dr. Rausser's and Dr. McClave's arguments unpersuasive on this point. The purpose of Dr. Kalt's structural break analyses was to test Dr. Rausser's maintained hypothesis that the alleged conspiracy is the cause of the structural break in the damages model. See Class Certification Hr'g Tr. (Sept. 29, 2016) at 842. It therefore was appropriate for Dr. Kalt to test whether Dr. Rausser's damages model finds structural breaks at other points in time, as the D.C. Circuit suggested, because those tests bear on the reliability of Dr. Rausser's damages model. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 254-55.

model, Dr. Rausser used only FSC-paying shipments in the class period because his review of the documentary record led to his hypothesis that defendants' behavior regarding fuel surcharges "affected the relationship between fuel prices and freight rates." Rausser Merits Reply at 228. Dr. Rausser asserts that to test the pre-class period properly, Dr. Kalt should have included all shipments — those with and those without fuel surcharges in both the pseudo pre-class period and the pseudo class period. See Rausser Supp. Reply at 88. As Dr. Rausser notes, "[t]here is no allegation or evidence of conspiracy focused on FSCs for shipments traveling in most of the pre-Class Period, and therefore no maintained hypothesis is available to make the demarcation of having only FSC paying shipments in the pseudo class period." Id. Further, Dr. Rausser points out, fuel surcharges were applied far less frequently in the pre-class period, and defendants applied "a variety of fuel cost recovery mechanisms" during the class period. Id. at 89. Dr. Kalt has no evidence outside of his data analysis to demonstrate that "FSCs inherently made freight rates more responsive to fuel prices, compared to freight rates that did not have FSCs, even irrespective of an FSC conspiracy." Id. It therefore was inappropriate for Dr. Kalt to compose his pre-class structural break analysis using all shipments in the pseudo pre-class period and only shipments with fuel surcharges in the pseudo class period.

Second, Dr. Kalt's pre-class structural break analysis is further undermined by his results, which include a "wrong sign" on a significant variable, the diesel fuel indicator variable. See Pls. Supp. Reply at 29. There are two key variables in Dr. Rausser's damages model that capture the effect of the alleged conspiracy: (1) a class indicator variable that distinguishes the class period from the pre-class period and (2) the class indicator variable multiplied by diesel fuel prices, also known as the diesel fuel indicator variable. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 373; Kalt Class Sur-Reply ¶ 41. The diesel fuel indicator variable "analyzes

the effect of fuel price increases on all-in rates." McClave Supp. Rep. at 9. Dr. McClave replicated Dr. Kalt's pre-class structural break analysis and found that there is a negative sign on the diesel fuel indicator variable — which would indicate that as fuel prices increase, freight rates decrease. Id. According to Dr. McClave, "[t]he relationships produced by Dr. Kalt's re-specified models indicate that transaction prices actually declined with increases in fuel prices during Dr. Kalt's 'pseudo-class' periods." Id. The Court agrees with Dr. McClave that Dr. Kalt's results run counter to basic economic principles and show that Dr. Kalt's pre-class structural break analysis is unreliable. See id. In essence, Dr. Kalt always finds a negative structural break because the negative sign on the diesel fuel indicator variable indicates that Dr. Kalt always finds a negative relationship between fuel costs and freight rates. Rausser Supp. Reply at 90-91 & Table 14. Dr. Rausser asserts that the diesel fuel indicator variable must be positive to be consistent with the basic premise that as fuel prices increase, all-in rates would increase from the fuel surcharges. Class Certification Hr'g Tr. (Sept. 27, 2016) at 374; see also Rausser Supp. Reply at 90-91.

Dr. Kalt explains in response that the negative sign on the diesel fuel indicator variable alone does not render his results unreliable because the diesel fuel indicator variable must be considered in tandem with the other variable that captures the effect of the conspiracy — the class period indicator variable. Kalt Class Sur-Reply ¶ 41. When considered together, Dr. Kalt opines that Dr. Rausser's damages model generates positive overcharges throughout the pre-class period. Id. ¶ 42. In support of his position, Dr. Kalt cites Dr. McClave's opinion that the two variables must be considered as a unit and the fact that Dr. Rausser himself had a negative class indicator variable in his "class and merits model" — the previous iteration of the

damages model before Dr. Rausser incorporated the STB data. Id. ¶ 41 n.81; see also McClave Merits Rep. at 27-28; Class Certification Hr'g Tr. (Sept. 28, 2016) at 675.

The Court finds Dr. Kalt's explanation unconvincing. Dr. Kalt asserts that his analysis shows that Dr. Rausser's damages model generates overcharges for shippers during the pre-class period when considering the class indicator variable and diesel fuel indicator variable together. Kalt Class Sur-Reply ¶¶ 41-42. Dr. Kalt, however, has not provided a persuasive explanation for why his results show negative structural breaks, which indicate that as fuel prices increased, freight rates decreased. McClave Supp. Rep. at 9. As Dr. Rausser and Dr. McClave have explained, those findings are inconsistent with basic economic theory.

Finally, plaintiffs' experts have suggested that Dr. Kalt's counterintuitive and negative results when running his pre-class structural break analysis may stem from the fact that his pseudo pre-class and pseudo class periods include too few data points from which to draw reliable conclusions. Rausser Supp. Reply at 92-94 & Figure 15; Class Certification Hr'g Tr. (Sept. 28, 2016) at 605-06. As both Dr. Rausser and Dr. McClave note, testing only limited sets of data based on short-term periods reduces the variation in the data that is required for the model to generate accurate estimations. Rausser Supp. Reply at 93; McClave Supp. Rep. at 9; see also Rausser Merits Reply at 229-30 ("The literature recognizes that to perform a meaningful benchmark comparison . . . requires sufficient data in both time periods."); Class Certification Hr'g Tr. (Sept. 28, 2016) at 605-06. Recall that Dr. Rausser's model was run on approximately 50 million transactions in the pre-class period. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 368. Dr. Rausser said that because Dr. Kalt uses too little data, his structural break analysis produces unreliable results. Rausser Supp. Reply at 94; see In re High-Tech Emp. Antitrust Litig., 289 F.R.D. 555, 580 (N.D. Cal. 2013) ("[I]n altering the benchmark periods, Defendants

have reduced the total amount of data available regarding the non-conduct periods . . . . [L]ess data may result in less accurate results.").

Regardless of the precise cause for Dr. Kalt's finding negative structural breaks, the Court agrees with plaintiffs' experts that the composition of Dr. Kalt's pre-class structural break analysis and his results indicate that his exercise is unreliable. The Court therefore concludes that Dr. Kalt's structural break analyses do not undermine the reliability of Dr. Rausser's damages model.

iv. False Positives: Whether Dr. Rausser's Model Includes Impermissible False Positives

The court of appeals directed this Court to consider on remand defendants' argument that Dr. Rausser's damages model is prone to false positives and "detects injury where none could exist." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252. Defendants argued to the court of appeals that the damages model should not find overcharges for legacy shippers, this is, "shippers who, during the Class Period, were bound by rates negotiated before any conspiratorial behavior was alleged to have occurred." Id. Defendants argued that if a shipment during the class period moved under a contract with a competitively set rate, then any overcharges shown for that shipper are a false positive because the damages model cannot distinguish between the effect of the alleged conspiracy and competitively negotiated conduct. As discussed infra at 173-81, the Court is persuaded by the reports and testimony of defendants' new experts on remand that Dr. Rausser's damages model finds unexplainable overcharges with respect to legacy shippers.

In contrast to the narrow issue defendants presented to the court of appeals, however, on remand, defendants have taken a "whack-a-mole" approach to the false positives

question and present numerous additional arguments the court of appeals was never asked to consider. Class Certification Hr'g Tr. (Sept. 26, 2016) at 209. Dr. Kalt suggests three additional discrete examples of false positives where Dr. Rausser's damages model calculates overcharges where defendants allege that there should be none: (1) when one sets all-in rates equal to defendants' variable costs; (2) when one sets each defendant's fuel surcharge rate on local carload traffic during the class period equal to its pre-class period fuel surcharge rate; and (3) when Dr. Rausser's model calculates overcharges that exceed the total fuel surcharge on a given shipment. The Court will address each of these false positives arguments in turn.

1. Rates Equal to Variable Costs. Dr. Kalt argues that Dr. Rausser's damages model should not find overcharges when shippers pay rates that are equal to defendants' variable shipping costs because, in such a counterfactual environment, defendants would merely recover their shipping costs and not profit from any alleged conspiracy. Kalt Class Rep. ¶¶ 61-64. Dr. Kalt ran Dr. Rausser's model by setting freight rates equal to variable costs and found "positive weekly overcharges for more than 33% of shipments" and an average class-wide weekly overcharge of -0.6%. Id. ¶ 63 & Figure 11.

Dr. Rausser offers two main responses. First, Dr. Rausser contends that Dr. Kalt's exercise "doesn't make any sense because it has a dependent variable cost, which is not the purpose for which [he] designed" the damages model. Class Certification Hr'g Tr. (Sept. 28, 2016) at 513. Dr. Rausser explains that his damages model is a model of prices, not costs, and suggests that Dr. Kalt's "substitution of prices with variable costs as the dependent variable" causes the positive overcharge estimates that Dr. Kalt finds but in no way undermines Dr. Rausser's model. Id. at 516. Second, Dr. Rausser argues that Dr. Kalt improperly excluded the STB intermodal data from his exercise and, that when Dr. Rausser reran Dr. Kalt's analysis

with that data, Dr. Rausser found only 10.5% of shipments have positive weekly overcharges and an average class-wide weekly overcharge of -5.0%. Rausser Supp. Reply at 96-97 & Figure 16. The finding of 10.5% of shipments with positive overcharges is consistent with Dr. Rausser's "maintained hypothesis" for the full class period that "there will be instances where there [are], in fact, positive damages, but there will be other instances where they're negative," and "[w]hat counts is what is the result for the full class period." Class Certification Hr'g Tr. (Sept. 28, 2016) at 514-15.

The Court agrees with Dr. Rausser that the output of his damages model is an average weekly overcharge of 9.8% during the class period, see Rausser Supp. Reply at 47, and that the average overcharge is the appropriate metric by which to judge Dr. Kalt's false positives test setting rates equal to variable costs. See Class Certification Hr'g Tr. (Sept. 28, 2016) at 514-15. Dr. Rausser's damages model tests his maintained hypothesis that defendants engaged in a conspiracy to charge supra-competitive fuel surcharges across the "full [class] period," resulting in a class-wide weekly overcharge that is an average of all class period data. Class Certification Hr'g Tr. (Sept. 28, 2016) at 514. The Court is not persuaded by Dr. Kalt's argument that 33% of shipments had positive weekly overcharges in his particular test. See. Kalt Class Rep. ¶ 63 & Figure 11. As Dr. Rausser points out, those shipments are offset by the shipments with negative class-wide weekly overcharges when one sets rates equal to variable costs. Class Certification Hr'g Tr. (Sept. 28, 2016) at 514. After those offsets, the result is a negative average class-wide weekly overcharge estimate whether one uses the STB intermodal data or not. Compare Kalt Class Rep., Figure 11, with Rausser Supp. Reply, Figure 16. The Court therefore finds that Dr. Kalt's exercise setting rates equal to variable costs does not demonstrate that Dr. Rausser's damages model produces false positives because — regardless of

whether one runs the exercise with or without the STB intermodal data — the exercise yields a negative average class-wide weekly overcharge that is entirely consistent with a non-conspiratorial counterfactual world where rates equal variable costs.[36]

2. Pre-Class Period Fuel Surcharges. Dr. Kalt's next false positives exercise compares each defendant's actual class period fuel surcharge rate on local carload traffic to each defendant's standard or "published" fuel surcharge rate on local carload traffic during the non-conspiratorial pre-class period. Kalt Class Rep. ¶ 99. Dr. Kalt found that the standard non-conspiratorial pre-class period fuel surcharge rate on local carload traffic for each defendant was higher than each defendant's actual, allegedly conspiratorial class period fuel surcharge rate, and that those standard pre-class period rates "would have generated more than $133 million more" in fuel surcharge payments to defendants than the actual class period rates. Id. ¶ 39 & Figure 3. Dr. Kalt considers this to be a false positive because Dr. Rausser's damages model finds positive overcharges for this local carload traffic during the class period when using the "the published pre-"conspiracy" carload provisions." Id. ¶ 100. This exercise is related to Dr. Kalt's earning power argument. Id. ¶ 39; see also Rausser Supp. Reply at 31 (characterizing this exercise as an outgrowth of Dr. Kalt's earning power metric).

Dr. Rausser identifies two errors in Dr. Kalt's work. Rausser Supp. Reply at 31-32. First, he suggests that "Dr. Kalt has not made a formula-to-formula comparison" because he "uses all [fuel surcharge] payments that occurred in the Class Period to calculate" each defendant's actual class period fuel surcharge rate on local carload traffic. Id. at 31. This differs

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[36] The Court is also skeptical that Dr. Kalt can switch the dependent variable in Dr. Rausser's "reduced form pricing model" from prices to costs without distorting the results the model produces. See Rausser Supp. Reply at 95 nn.319-20. Dr. Kalt never responded to this criticism to explain why such a switch is justified on the basis of either logic or regression modeling in econometrics. See Kalt Class Sur-Reply ¶ 45.

from the way in which Dr. Kalt calculated each defendant's pre-conspiracy fuel surcharge rate: applying each defendant's "standard carload" fuel surcharge formula in place just before the start of the class period to the base rates on carload shipments during the class period. Id. Second, Dr. Rausser contends that Dr. Kalt erred in choosing the December 2002 WTI carload fuel surcharge formula as UP's standard pre-class period formula because Dr. Kalt previously opined in two depositions that UP's standard pre-class period formula was the so-called "FMC/FUEL" formula. Id. at 32 & nn.107-08.

The Court agrees with Dr. Rausser that Dr. Kalt's pre-class period fuel surcharge exercise is not useful because it (1) contains an apples-to-oranges comparison and (2) uses the wrong "standard" pre-class period fuel surcharge formula for UP. First, by applying each defendants' pre-class "standard" formula to carload shipments in the class period, Dr. Kalt papers-over "all of the 'differentiated' pre-Class Period FSC formulas." See Rausser Supp. Reply at 31. As Dr. Rausser points out, Dr. Kalt took into account such differentiation when he calculated each defendant's class period fuel surcharge rate based on all of its class period fuel surcharge payments, but not when applying the pre-class period standard formulas. Id. This variation would not be a problem had Dr. Kalt calculated each defendant's class period fuel surcharge rate using its standard class period formula, but Dr. Kalt instead calculated that rate for each defendant using actual class period data that accounts for the variation. Id. at 32. Such an apples-to-oranges comparison does not demonstrate that Dr. Rausser's damages model produces false positives. Second, the Court agrees with Dr. Rausser's critique that Dr. Kalt chose the incorrect standard pre-class period fuel surcharge formula for UP. Id. at 32 & nn.107-08. Dr. Rausser cites evidence that Dr. Kalt used a standard formula for UP that he twice previously

stated was not UP's most common pre-class period formula, and Dr. Kalt provides no competing explanation. See id.

Dr. Rausser re-ran Dr. Kalt's exercise after correcting for these two errors and reached contrary results: three of the four defendants' class period fuel surcharge rates on local carload traffic exceeded their pre-class period rates, while BNSF's rate remained exactly the same. Rausser Supp. Reply at 32 & Table 2. When corrected, Dr. Rausser found that the class period fuel surcharges on local carload traffic had $185 million more earning power than the pre-class period fuel surcharges, which is consistent with his maintained hypothesis of conspiratorial overcharges. Id. Dr. Rausser's calculations correcting for the two errors he identifies are more reliable that Dr. Kalt's exercise and are consistent with Dr. Rausser's maintained hypothesis of conspiratorial overcharges during the class period. The Court therefore concludes that Dr. Kalt's exercise does not demonstrate that Dr. Rausser's damages model produces false positives with respect to pre-class period fuel surcharges.

3. Overcharges in Excess of Fuel Surcharges. Finally, Dr. Kalt found that "38% of shipments, accounting for $15 billion (35% of Class revenue), have implausibly high" overcharges that exceed the fuel surcharge on the shipment. Kalt Class Sur-Reply ¶ 63 & Figure SR-11. Dr. Kalt claims that this finding is a false positive of sorts because overcharge estimates in excess of fuel surcharges mean that the model is finding overcharges in a way that is "disconnected from [plaintiffs'] theory of liability," i.e., a conspiratorial inflation of fuel surcharges. Id. ¶ 63. Dr. Rausser responds that defendants often "double-dipp[ed]" during the conspiracy by inflating fuel surcharges and increasing base rates, which would produce the implausible overcharges Dr. Kalt identifies. Rausser Merits Reply at 244. Dr. Kalt disagrees, stating that there is "no empirical support for" this double-dipping. Kalt Class Sur-Reply ¶ 63

n.115. But Dr. Rausser cited a 2007 STB decision recognizing the practice of "double dipping," Rausser Merits Reply at 244 n.726, which the STB defined as "when a carrier both escalates a base rate using an index (such as the RCAF) that includes changes in the cost of fuel and applies a fuel surcharge to the same movement covering the same time period." Rail Fuel Surcharges, STB Ex Parte 661, 2007 WL 201205, at *7 (STB served Jan. 26, 2007). The decision itself provides empirical evidence for the practice because the STB concluded that "the practice of 'double dipping' . . . is an unreasonable practice, and . . . direct[ed] carriers to change this practice." Id. at *1. The Court credits Dr. Rausser's explanation that double dipping accounts for the damages model calculating overcharges that are larger than fuel surcharges, and therefore concludes that such overcharges are not false positives as Dr. Kalt claims.

c. Issues Precluding a Finding of Predominance

In this part, the Court address three of defendants' criticisms that the Court finds persuasive. These key issues separately, or together, undermine the reliability of Dr. Rausser's damages model, which as the court of appeals noted, is essential for plaintiffs to satisfy the predominance requirement of Rule 23(b)(3). See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 253. The Court addresses: (1) intermodal traffic, which was subject to competitively negotiated formulas established during the pre-class period and were never changed, (2) legacy shippers, for which Dr. Rausser's damages model finds unexplainable overcharges; and (3) the large number of uninjured shippers in the class, which makes it impossible for plaintiffs to satisfy the "all or virtually all" standard for predominance. At least 2,000 individualized inquiries will be necessary to determine whether these putative class members were actually injured by the alleged conspiracy.

i. Intermodal Shippers: Class Traffic Subject to Competitively Negotiated Formulas

The documentary record has not changed. It still shows — primarily through email exchanges, internal corporate memos, and the depositions of defendants' executives, see supra at 130-38 — that new, more aggressive fuel surcharges were imposed during the class period and that defendants all sought to enforce these new fuel surcharges on shippers uniformly and with few exceptions. See supra at 135-38. Defendants now argue, however, that a large portion of class traffic — so-called intermodal traffic — was subject to competitively negotiated fuel surcharge formulas that were established during the pre-class period and never changed or, in some cases, were even reduced during the class period. See Class Certification Hr'g Tr. (Sept. 26, 2016) at 189-90; Defs. Supp. Opp. at 26.

Recall that there are two basic types of rail traffic: intermodal traffic and carload traffic. See Class Opp. at 14 n.19; Class Certification Hr'g Tr. (Sept. 26, 2016) at 183-84. Intermodal traffic travels by rail and one other mode of transportation such as truck or ship. Class Certification Hr'g Tr. (Sept. 26, 2016) at 186. All other rail traffic is known as carload traffic. Class Opp. at 14 n.19. Each railroad has a separate and different published fuel surcharge formula for carload and for intermodal traffic with, for example, different trigger points and different escalation points. Class Certification Hr'g Tr. (Sept. 26, 2016) at 188. The class definition includes both carload and intermodal shippers. Defendants argue that Dr. Rausser's model is not reliable because only carload fuel surcharge formulas changed during the class period, allegedly as a result of the conspiracy, and yet the model generates substantial overcharges for both carload and intermodal traffic.

Intermodal traffic accounts for a significant portion of both the class traffic and the class revenue that is at issue in this case. For example, in 2004, intermodal traffic constituted

42% of BNSF's traffic; in 2006, intermodal traffic was 33% of NS's traffic. Class Certification Hr'g Tr. (Sept. 26, 2016) at 185. Defendants point first to BNSF's intermodal fuel surcharge formula — which did not change from 2001 through the end of the class period — as evidence that plaintiffs cannot show class-wide injury or impact through common evidence. See id. at 191. Dr. Rausser acknowledges that the BNSF intermodal formula did not change during the class period. See OD Ex. 6, Rausser Dep. (Mar. 5, 2014) at 394-95. His damages model nonetheless measures $522 million in overcharges for BNSF intermodal shippers during the class period. See Kalt Class Rep. ¶ 98 n.142; Class Certification Hr'g Tr. (Sept. 26, 2016) at 191.

Nor did the NS domestic intermodal formula change after 2002, Class Certification Hr'g Tr. (Sept. 26, 2016) at 190. And UP actually lowered its intermodal formula during the class period by 3.9%. Defs. Supp. Opp. at 27; Rausser Merits Reply at 172; Kalt Class Rep. ¶ 97. CSX is the only one of the four defendants that did not provide intermodal service during the class period. Defs. Supp. Opp. at 27 n.16.[37] Dr. Rausser's damages model measures $872 million in overcharges for all of defendants' intermodal class traffic. Kalt Class Rep. ¶ 98 n.142.

Because BNSF and NS did not change their intermodal formulas — for example, by changing the trigger price or surcharge percentage — defendants question how plaintiffs can establish through Dr. Rausser's models that these overcharges are attributable to the alleged conspiracy and not to the rise in fuel prices. See Class Certification Hr'g Tr. (Sept. 26, 2016) at

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[37] CSX Intermodal ("CSXI") was a separate company from CSX during the class period and is not a party to this case. Defs. Supp. Opp. at 27 n.16. CSXI shippers therefore are not class members. Id. Dr. Kalt notes, however, that Dr. Rausser has attributed overcharges to CSXI transactions during the class period. See Kalt Class Rep. ¶ 1 n.3. For the purposes of class certification, the parties have not offered any argument about whether CSXI shipments should or should not be included in Dr. Rausser's analysis, and therefore the Court will not address this issue at this stage.

191. If plaintiffs cannot offer a class-wide answer for why both carload and intermodal shippers — not just the former — suffered overcharges, then plaintiffs have not established that injury-in-fact is capable of proof at trial with evidence that is common to the class. The question before the Court then is whether plaintiffs have offered reliable evidence to explain how intermodal shippers experienced hundreds of millions of dollars in overcharges, when defendants never changed the intermodal fuel surcharge formulas. Without a theory of class-wide impact and evidence to support that theory, the Court cannot conclude that plaintiffs have established by a preponderance of the evidence that injury-in-fact is capable of proof at trial with common evidence.

Plaintiffs maintain that a fundamental aspect of the alleged conspiracy is that defendants conspired to apply and aggressively enforce their fuel surcharge formulas on all customers and succeeded in doing so. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 304; Pls. Supp. Reply at 7-9. They argue that defendants have offered no explanation as to whether or how often BNSF was actually able to apply and enforce the published intermodal fuel surcharge formula before the start of the alleged conspiracy and how that may or may not have changed once the conspiracy started. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 304 (arguing that defendants say nothing "about how often BNSF was able to apply this published intermodal formula prior to the start of the conspiracy and how that changed once the conspiracy was underway").[38] Plaintiffs say that the intermodal shippers might have received discounts or

[38] At the class certification hearing, plaintiffs also argued that even though BNSF did not change its intermodal fuel surcharge formula that is not evidence that BNSF did not seek to apply a more aggressive formula on its intermodal shippers. For May 2003, BNSF chose to reduce its carload fuel surcharge for one month because its higher fuel surcharge placed it at a competitive disadvantage. See TD Ex. 66, E-mail from Linda L. Wertz, to BNSF Carload Customers (Apr. 29, 2003, 5:08 PM), at BNSF-0495602; TD Ex. 72, Draft Fuel Surcharge Script, at BNSF-0572406. Because BNSF had previously chosen to reduce its carload fuel

waivers during the pre-class period despite the published and unchanged intermodal formula. Class Certification Hr'g Tr. (Sept. 30, 2016) at 1224 (arguing that the fact that there was a formula in place does not "tell us anything about how widely it was applied before the class period versus during," that is, the formulas might have been discounted); see also Class Certification Hr'g Tr. (Sept. 27, 2016) at 304-06. Plaintiffs therefore maintain that intermodal shippers were significantly impacted by defendants' across-the-board, aggressive enforcement of the fuel surcharge programs even though the intermodal shippers' fuel surcharge formulas did not change after the alleged conspiracy began.

The problem with plaintiffs' argument is that there is no evidence in the record to support the notion that intermodal shippers received massive discounts or waivers from the published intermodal formulas. The documentary record does show that BNSF had difficulty applying fuel surcharges without offering other discounts before the start of the conspiracy, and that BNSF did seek to aggressively apply and enforce fuel surcharges with respect to all of its customers during the class period. But plaintiffs have not identified any evidence in the record of any "BNSF intermodal pre-class period waiver or renegotiation to support the notion that there would have been enough to generate $522 million worth of relief for shippers during the

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surcharge in the face of competitive pressure, plaintiffs contend that the fact that BNSF never changed its intermodal formula is "at least as compelling an argument of collusion as it is an argument that there was no collusion." Class Certification Hr'g Tr. (Sept. 27, 2016) at 305. Dr. Rausser also testified at the class certification hearing that defendants' intermodal formulas were "already aggressive" compared to other pre-class fuel surcharge formulas. Class Certification Hr'g Tr. (Sept. 28, 2016) at 505.

The Court finds both of these arguments unpersuasive. First, plaintiffs have offered no evidence that BNSF had considered changing its intermodal formula and later chose not to; plaintiffs simply ask the Court to infer BNSF's intent from the absence of a change to its intermodal formula. Second, Dr. Rausser provided no background or further explanation for his assertion that intermodal formulas during the pre-class period were "already aggressive." The Court therefore will give this opinion no weight.

class period." Class Certification Hr'g Tr. (Sept. 26, 2016) at 192. Defendants reasonably ask "how is it possible to use common proof to prove that BNSF intermodal shippers would have gotten $522 million worth of concessions during the class period?" Id. at 191. As defendants' counsel put it, Dr. Rausser's theory is "completely untethered to the evidence." Id. at 192.

Dr. Rausser acknowledged as much at the class certification hearing. He testified that while the BNSF published intermodal formula never changed from 2001 through the end of the class period, Class Certification Hr'g Tr. (Sept. 28, 2016) at 505, "that doesn't mean that there wasn't some incremental fuel surcharge beyond the [intermodal] formula with regard to the transaction database." Id. at 507. With respect to BNSF, he said he did not have the data from BNSF to support or quantify this observation. Id. at 504, 507-08. He was then asked about the other three carriers' intermodal formulas for which he did have data:

> THE COURT: Based on your study of the intermodal formulas and possible changes for the other three carriers, were there such incremental changes with respect to the other three carriers during the class period, even though the formula remained the same?
>
> THE WITNESS: With respect to intermodal?
>
> THE COURT: Yes.
>
> THE WITNESS: Just intermodal. I have seen no evidence of that.

Id. at 509.

Without specific evidence that BNSF or the other intermodal shippers obtained waivers in the pre-class period and some calculation of the dollar value of those waivers, plaintiffs have not met their burden of showing from the documentary record that those intermodal shippers would have continued to receive waivers and would have received millions of dollars' worth of discounts in the class period absent the alleged conspiracy. The fact that Dr. Rausser's damages model shows overcharges for intermodal shippers, Rausser Supp. Reply

at 123-24 & Table 32 — without a persuasive theory as to why the model shows overcharges for those shippers — cannot fill the gaps left by the absence of evidence in the documentary record.

Dr. Kalt has offered quantitative evidence to rebut plaintiffs' unsubstantiated theory that intermodal shippers would have obtained large-scale concessions in the absence of the conspiracy. Dr. Kalt took the pre-class period waiver rate for NS (2.9%) — the only available waiver rate from the pre-class period — and applied it to class and legacy traffic.[39] According to Dr. Kalt, if defendants had continued to waive fuel surcharges during the class period at the same rate as NS did during the pre-class period (2.9%), then those waivers would account for only a small portion of fuel surcharge revenue during the class period. Kalt Class Rep. ¶ 115 & Figure 23. Dr. Kalt maintains that defendants would have needed to waive or otherwise not collect 82.5% of fuel surcharge revenue during the class period in order to explain the amount of or overcharges reflected in Dr. Rausser's damages model. Id. In other words, in the absence of the alleged conspiracy, shippers would have had to negotiate waivers of 82.5% of their class period fuel surcharges in order to explain Dr. Rausser's overcharge estimates. Dr. Kalt concludes that there is no support in the documentary record "for such massive non-collection" of fuel surcharges. Id. ¶ 115. Although Dr. Kalt's waiver exercise involves all class traffic — carload and intermodal — it nevertheless soundly rebuts plaintiffs' and Dr. Rausser's reliance on the documentary record to explain that intermodal shippers were impacted by defendants' aggressive enforcement of the fuel surcharge programs.

Without a sufficient explanation — either in the record evidence or through Dr. Rausser's damages model — as to how intermodal shippers could have suffered millions of

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[39] As noted, this 2.9% waiver rate is derived from the NS pre-class period transaction data. See supra note 12.

dollars in overcharges, plaintiffs have not shown by a preponderance of the evidence that there is common evidence that could be used to explain the overcharges to intermodal shippers from defendants' fuel surcharge enforcement during the alleged conspiracy. The Court therefore cannot conclude that there is a class-wide answer to the question of how both intermodal and carload shippers were injured by the alleged conspiracy.

Defendants make a separate argument that the carload fuel surcharge formulas — which did change during the class period — were not more aggressive. They argue that those class period formulas did not have more "earning power" than the pre-class fuel surcharge formulas, and therefore that any changes "did not 'yield more revenue' at Class Period fuel prices." Defs. Supp. Opp. at 26; see also Class Certification Hr'g Tr. (Sept. 26, 2016) at 156. As a result, they maintain that the class period fuel surcharges for carload shipments were not more aggressive than the pre-class period fuel surcharges, even though the carload fuel surcharge formulas did change. See Kalt Class Rep. ¶¶ 96-98 & Figure 17; Defs. Supp. Opp. at 27-32. This argument is based on Dr. Kalt's so-called "earning power" analysis.

Because the Court has concluded that neither the documentary record nor Dr. Rausser's damages model supports plaintiffs' position that intermodal shippers suffered overcharges in the amount of $872 million — or in any quantifiable amount — and because Dr. Rausser's models include both intermodal and carload shipments, it need not discuss defendants' earning power argument. Suffice it to say that the Court agrees with plaintiffs that Dr. Kalt's earning power critique is not persuasive. It looks at carload formulas in isolation without regard to the more aggressive application and enforcement of fuel surcharges on carload shipments during the alleged conspiracy. It also is inconsistent with the documentary record and the statements of defendants' own executives that the new carload fuel surcharge formulas were

more aggressive and yielded substantially more revenue. See, e.g., Pls. Supp. Reply at 8-10; Class Certification Hr'g Tr. (Sept. 26, 2016) at 55; see also supra at 130-38.

ii. Legacy Shippers: Dr. Rausser's Damages Model Finds Unexplainable Overcharges

The Court now addresses defendants' argument that Dr. Rausser's damages model also generates overcharges for legacy shippers — those shippers who were bound by rates negotiated before the alleged conspiracy. Legacy shippers are not members of the plaintiff class, but defendants have attempted to run Dr. Rausser's damages model on legacy shipper transaction data to demonstrate that the model shows injury where there could be none, thereby undermining its reliability. See Defs. Supp. Opp. at 16-17. Dr. Kalt states that Dr. Rausser's damages model yields a 9.7% average weekly overcharge for legacy shipments, almost identical to the 9.8% average weekly overcharge for class shipments. Kalt Class Rep. ¶¶ 6, 35.[40] According to defendants, because Dr. Rausser's damages model finds overcharges for shippers who were bound by rates negotiated before the start of the alleged conspiracy, Dr. Rausser's model cannot distinguish conspiratorial from non-conspiratorial conduct and therefore is unreliable. See Defs. Supp. Opp. at 5; Class Certification Hr'g Tr. (Sept. 26, 2016) at 147.

On remand, plaintiffs offer the expert opinion of Dr. Rausser to show that legacy shippers were also harmed by the alleged conspiracy during the class period, and therefore that his damages model reliably shows overcharges for legacy shipments. See Pls. Supp. Mem. at 13-38; Rausser Supp. Rep. at 6-23, 35-75. Plaintiffs presented this argument to the court of

[40] Dr. Rausser disputes that Dr. Kalt properly excluded certain legacy shipments from this overcharge calculation based on Dr. Rausser's legacy decomposition analysis, which the Court addresses in this section. See Rausser Supp. Rep. at 80-81. Regardless of the exact value of overcharges for legacy shippers, neither plaintiffs nor Dr. Rausser dispute that Dr. Rausser's damages model shows overcharges for legacy shippers.

appeals — albeit without Dr. Rausser's remand legacy contracts analysis. The court of appeals left it to this Court to consider the argument in the first instance, but noted that the claim "runs directly counter" to this Court's "factual finding that 'the fuel surcharge programs applied before the class period were nothing like the widespread and uniform application of standardized fuel surcharges during the class period.'" In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 254 (quoting Rail Freight III, 287 F.R.D. at 48).

In response, Dr. Rausser offers two key opinions for why legacy shippers were harmed during the class period and therefore why his damages model reliably shows overcharges for legacy shipments. First, there was a general change in the economic environment between the pre-class period and the class period as a result of defendants' efforts to widely apply and enforce fuel surcharges during the class period. Second, Dr. Rausser asserts that his legacy decomposition analysis demonstrates that the majority of legacy shippers were not true legacies because they were not bound by rates negotiated during the pre-class period. Defendants argue that plaintiffs have failed to meet their burden to "adduce specific evidence that the [damages] model doesn't produce false positive[s] when applied to legacy shipments and reconcile any such evidence with their own theory of collusion." Class Certification Hr'g Tr. (Sept. 30, 2016) at 1190; see id. at 1191 (arguing that one cannot "reconcile tainted legacies with the whole narrative that there's a black-and-white difference between what was the fuel surcharge situation before the Class Period and what it was afterwards"); In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 254. The central question before the Court therefore is whether plaintiffs have shown by a preponderance of the evidence that Dr. Rausser's damages model does not show false positives for legacy shippers. The Court concludes that plaintiffs have failed to meet that burden, undermining the reliability of Dr. Rausser's damages model for

use as common evidence of class-wide injury. The Court addresses each aspect of Dr. Rausser's opinion on legacy shippers in turn.

First, Dr. Rausser states that all legacy shippers would have been harmed by the alleged conspiracy due to the changed and more aggressive economic environment during the class period. See Rausser Supp. Rep. at 5. To support his opinion, Dr. Rausser points to the factual record, which suggests that defendants instituted policies to strictly enforce and apply fuel surcharge provisions only after the alleged conspiracy began. See id. at 7-10. He notes that fuel surcharges were only "theoretically billable" in the pre-class period because shippers often resisted fuel surcharge application through negotiation and waivers. Id. at 8-10. Dr. Rausser opines that, absent the alleged conspiracy, legacy shippers would have continued to resist the fuel surcharges during the class period and would have sought to renegotiate their contracts with fuel surcharges as fuel prices rose. See id. at 11. According to Dr. Rausser, "[i]t is reasonable to expect that, in an environment of competition, Defendants would have yielded to resistance from shippers (including legacy shippers) and reduced or offset the dramatically increasing FSC rates that Defendants applied during the Class Period, either by adjusting those FSC rates, re-pricing base rates or offering other concessions." Id. at 5. Dr. Rausser concludes that all legacy shippers would have been harmed because in absence of the alleged conspiracy, legacy shippers would have been successful in renegotiating their contracts and obtaining fuel surcharge waivers from defendants. See id.

Dr. Rausser's opinion that the change in the economic environment affected all legacy shippers during the class period is unpersuasive. He offers no quantitative analysis to support his proposition that absent the alleged conspiracy legacy shippers would have been able to force defendants to reduce or waive fuel surcharges during the class period, when fuel prices

were rising. See Rausser Supp. Rep. at 5, 7-11. As Dr. Kalt notes, Dr. Rausser's theory "assumes that, having negotiated for contractual protection against the risk of rising fuel prices, the railroads (absent conspiracy) would then have waived the very protection for which they had negotiated." Kalt Class Rep. ¶ 118.

To test Dr. Rausser's hypothesis, Dr. Kalt attempted to quantify what level of waivers would be required to explain the overcharges for legacy shippers. See Kalt Class Rep. ¶ 114-15. He took NS's waiver rate from the pre-class period (2.9%) and applied it to the legacy shipments in the class period. Id. ¶ 115.[41] If defendants had continued to waive fuel surcharges at the rate NS did in the pre-class period, those waivers would account for only a small portion of the overcharges generated for legacy shippers. Id., Figure 23. According to Dr. Kalt, defendants would have needed to waive — or not collect — 75.5% of fuel surcharge revenue to explain the overcharges to legacy shippers. Id. ¶¶ 114-15 & Figure 23.

Without quantitative evidence to explain how many legacy shippers would have been harmed by the alleged conspiracy, Dr. Rausser returns to the factual record to attempt to support his conclusion. On this occasion, Dr. Rausser's reliance on the factual record is misplaced. The record does not support Dr. Rausser's assumption that in absence of the alleged conspiracy all or a substantial number of legacy shippers would have been able to renegotiate their contracts to escape the fuel surcharges in their preexisting contracts. As previously discussed, supra at 135-38, defendants sought 100% fuel surcharge coverage during the class period. See, e.g., HD Ex. 83, Lawson Dep. (Aug. 5, 2010) at 38; HD Ex. 149, Letter from John J. Koraleski to James K. Harmon (Apr. 22, 2005), at UPFSC 0342883; RD Ex. 141, E-mail from

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[41] As previously noted, NS's pre-class period waiver rate is the only currently available rate of the four defendants. See supra at 171.

Dean Piacente (June 5, 2006, 2:28 AM), at CSFXFSC000086200; RD Ex. 91, Letter from Sam Kyei, to Matt Rose (May 28, 2004), at BNSF-0325449. The documentary record also shows that defendants were hard-pressed to bill and collect fuel surcharges during the pre-class period. See, e.g., TD Ex. 86, E-mail from Don Seale, to David Julian (July 7, 2003, 11:50 AM), at NS_057005733; TD Ex. 55, BNSF Enterprise Wide Risk Assessment (May 28, 2002), at BNSF-0574624_011. But there is no support in the record for the proposition that defendants would have waived millions of dollars in fuel surcharge revenue from legacy shippers with preexisting contracts when fuel prices increased during the class period. Dr. Rausser's reliance on the factual record simply does not support his assertion that legacy shippers were harmed by the alleged conspiracy and the increase in defendants' fuel surcharge enforcement.

As a theoretical matter, it may be correct that in the absence of an alleged conspiracy, some legacy shippers would have been able to renegotiate their preexisting contracts as fuel prices — and therefore fuel surcharge revenue — rose. But Dr. Rausser has provided no information as to who those shippers are and — even more importantly — how much revenue defendants would have waived in the absence of the alleged conspiracy. He simply asserts that all legacy shippers were harmed from defendants' aggressive enforcement of fuel surcharges during the class period. Without either documentary or quantitative evidence, the Court cannot accept as reliable or probative Dr. Rausser's conclusion that all legacy shippers — or even a substantial number of them — were harmed from the alleged conspiracy or that his model reliably shows overcharges for legacy shippers.

Second, the Court also is not persuaded by Dr. Rausser's legacy decomposition analysis. Defendants identified 29.3 million legacy shipments. Rausser Supp. Rep. at 37. Through his legacy decomposition exercises, Dr. Rausser attempts to show that a majority of

legacy shipments are not "true" legacy shipments. Based on his analysis, Dr. Rausser concludes that defendants' false positives argument is based on a "false premise" that "the alleged conspiracy could not have affected shipments under legacy contracts, because the FSC formulas embedded in those contracts were agreed upon between railroad and shipper before the alleged conspiracy was [underway]." Rausser Supp. Rep. at 4; see also supra at 50-58. Specifically, Dr. Rausser determined that the legacy shipments for which he has adequate fuel surcharge data fall into one of four categories: (1) 42.68% of legacy shipments moved under contract provisions with "self-adjusting fuel surcharges," meaning that the contract provision stated that the shipper would pay the fuel surcharge existing at the time of the shipment, rather than a fuel surcharge price agreed upon before the alleged conspiracy began ("Category 1"); (2) 26.00% of legacy shipments moved under a fuel surcharge provision created during the conspiracy period ("Category 2"); (3) 5.36% of legacy shipments moved under a contract provision entered into during the formation of the conspiracy, March 1 through July 1, 2003 ("Category 3"); and (4) 6.36% of legacy shipments moved under contracts entered into on or after July 1, 2003 ("Category 4"). Rausser Supp. Rep. at 38 & Table 28.[42]

The Court agrees with Dr. Rausser that shipments in his Categories 2, 3, and 4 could have been affected by the alleged conspiracy. These categories include (1) shipments that moved under a fuel surcharge provision created during the conspiracy period, (2) shipments that moved under a contract provision entered into during the formation of the conspiracy, March 1 through July 1, 2003, and (3) shipments under a contract entered into on or after July 1, 2003. But those categories of shipments account for only 37.72% of the shipments Dr. Rausser

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[42] Dr. Rausser does not label these last two categories as "Category 3" and "Category 4." The Court will use these references for its own discussion.

analyzed, which is not all — or even a substantial portion — of the legacy shipments identified by defendants. Ultimately, the Court finds two fatal flaws in Dr. Rausser's legacy decomposition analysis: (1) it does not sufficiently explain the self-adjusting contracts (Category 1), and (2) 10.4 million legacy shipments were excluded from his analysis and there is simply no information as to how many of these contracts fall into each of Dr. Rausser's four categories.

Dr. Rausser emphasizes that 42.68% of legacy shipments moved under contracts with "self-adjusting" fuel surcharge provisions. See Rausser Supp. Rep. at 37-38 & Table 28. Self-adjusting contracts refer to contracts containing provisions that stated that the shipper would pay the fuel surcharge existing at the time of the shipment, rather than a fuel surcharge price agreed upon before the alleged conspiracy began. This would be persuasive evidence that legacy contracts were adjusted to allegedly conspiratorial fuel surcharge rates if Dr. Rausser had verified that those contracts were in fact adjusted to higher, class period fuel surcharges. In his Supplemental Report, Dr. Rausser cites some examples of individual legacy contracts that included self-adjusting contracts that were later amended. See id. at 40-44, 62-64. These examples are undercut by Dr. Rausser's own testimony that he included shipments in this category that were never in fact adjusted to a higher, allegedly conspiratorial fuel surcharge and that he was unable to identify or quantify shipments that were actually adjusted. See Class Certification Hr'g Tr. (Sept. 28, 2016) at 492-95. At one of his depositions, Dr. Rausser was asked whether the shipments he categorized as not "true" legacies actually experienced a change in the fuel surcharge:

> *Q.* Do you know what percentage of the 19 million shipments that you analyzed experienced any change in the applicable fuel surcharge formula as a result of a Category 1 or Category 2 event?
> . . .

> THE WITNESS: In the migration of the pre-class-period formulas to class-period formulas for both Categories 1 and 2, there is an increase. The percentage I haven't computed it.
>
> *Q.* There is always an increase?
>
> THE WITNESS: I didn't say there is always an increase.

OD Ex. 4, Rausser Dep. (Mar. 4, 2014) at 127-28; see also id. at 131 (*Q.* . . . Do you know how often it is true that when that [adjustment] takes place the fuel surcharge changed? *A.* Once again, I haven't computed that percentage.").

Dr. Rausser also acknowledged that he reclassified some legacy shipments to his self-adjusting contracts Category 1 even in cases where (1) there was no change to the contract's fuel surcharge formula during the class period, see Class Certification Hr'g Tr. (Sept. 28, 2016) at 496, and (2) where the fuel surcharge formula in a contract was reduced, as was the case for UP's intermodal legacy shipments. See OD Ex. 4, Rausser Dep. (Mar. 4, 2014) at 131-32; Defs. Supp. Opp. at 53-54. With respect to self-adjusting contracts, Dr. Rausser testified on cross-examination:

> *Q.* Nor did this decomposition analysis examine or turn on whether any adjustment that might have occurred resulted in any change to the fuel surcharge formula in particular, correct?
>
> THE WITNESS: It depends. In some cases we had the underlying templates with regard to the fuel surcharges and they changed. In other cases we only had the amount that was actually charged.
>
> *Q.* When you report statistics for the percentage of shipments that are in your Category 1 [self-adjusting contacts], that involves no culling of the data to determine — to refine . . . so that it is only including those contracts that were adjusted and the adjustment changed the fuel surcharge, correct?
>
> THE WITNESS: It includes both, as I indicated.

Class Certification Hr'g Tr. (Sept. 28, 2016) at 494-95. From Dr. Rausser's statements and his reports, the Court cannot conclude that all or a substantial portion of the thousands of shipments that Dr. Rausser categorized as not "true" legacies were ever adjusted to a higher, conspiratorial fuel surcharge. Without knowing whether or how many of these legacy contracts were in fact adjusted, the Court cannot know whether these legacy shipments were affected by the alleged conspiracy.

The Court also has no information about the 10.4 million legacy shipments not included in Dr. Rausser's legacy decomposition analysis. See Rausser Supp. Rep. at 37 & n.124; OD Ex. 4, Rausser Dep. (Mar. 4, 2014) at 108-09. As the Court has noted, see supra at 56, Dr. Rausser stated that he excluded these shipments from his analysis because there was no fuel surcharge program information in the transaction data he was provided for those shipments. See OD Ex. 4, Rausser Dep. (Mar. 4, 2014) at 108-09. This lack of information is troubling when applied to specific examples such as BNSF's legacy shipments. As part of the 10.4 million legacy shipments, Dr. Rausser excluded all of BNSF intermodal legacy shipments, which were 68% of BNSF's legacy shipments. See id. at 243-45; Defs. Supp. Opp. at 51. The BNSF intermodal fuel surcharge never changed, see supra at 166-67, and therefore these shipments could not have been adjusted to a higher, allegedly conspiratorial fuel surcharge. Dr. Rausser's damages model generates $70 million in overcharges for BNSF intermodal legacy shipments. Class Certification Hr'g Tr. (Sept. 26, 2016) at 197. Yet Dr. Rausser has provided no explanation as to how these shipments were affected by the alleged conspiracy beyond his unpersuasive opinion regarding a change in the economic environment during the class period. Dr. Rausser's legacy decomposition findings simply are unreliable and fail to establish by a preponderance of the evidence that legacy shippers were harmed by the alleged conspiracy.

Dr. Rausser faults Dr. Kalt for not "perfom[ing] an economic analysis or consider[ing] any mechanism through which, once in an environment of FSC conspiracy, the legacy shippers could have escaped the effects of that conspiracy." Rausser Supp. Rep. at 20. But it is not defendants' burden to show how legacy shippers escaped the alleged conspiracy. Given that Dr. Rausser's damages model generates millions of dollars in overcharges for legacy shippers, it is plaintiffs' burden to show that legacy shippers were affected by the alleged conspiracy. The Court concludes that plaintiffs have failed to meet that burden by a preponderance of the evidence. The Court therefore cannot find that Dr. Rausser's damages model reliably distinguishes overcharges due to the alleged conspiracy from competitively negotiated conduct. This flaw is fatal to plaintiffs' motion for class certification because the Court cannot conclude that Dr. Rausser's damages model is a reliable means for proving class-wide injury.[43]

iii. Proposed Class Includes Too Many Uninjured Members

The next issue is whether Dr. Rausser's damages model can reliably demonstrate common impact and support plaintiffs' argument that common issues predominate when it is undisputed that the model shows a number of uninjured class members. The Court proceeds by discussing (1) the D.C. Circuit's opinion in this case as it relates to uninjured class members; (2) whether class certification is defeated if there are a de minimis number of uninjured shippers

[43] Defendants assert that the overcharges for legacy shippers are caused, at least in part, by the constant fuel coefficient in Dr. Rausser's damages model. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 222. Although the Court concluded that a constant fuel coefficient is more reliable than a variable fuel coefficient based on the opinions and exercises submitted by the experts in this case, see supra at 142-52, the Court need not determine the exact cause of the overcharges for legacy shippers. It is enough to conclude that Dr. Rausser's model shows unexplainable overcharges for legacy shippers.

in the class; (3) the relative number of uninjured members in the class; (4) the effect of prediction error on the number or percent of uninjured class members; and (5) whether the percentage of injured class revenue is a legitimate measure of injury to satisfy predominance.

1. D.C. Circuit's Opinion. In their briefing prior to the first class certification hearing in this case, defendants argued that to obtain class certification, plaintiffs "must proffer a 'valid method' for proving . . . injury to all or virtually all class members on a 'simultaneous, class-wide basis,' that is, a method that does not require examining the individual class members' circumstances." Class Opp. at 26-27. Defendants argued that plaintiffs failed to meet this standard, in part, because of the number of uninjured members in the proposed class. Id. The Court addressed this argument in its initial opinion granting class certification, finding by a preponderance of the evidence that defendants "applied" fuel surcharges "uniformly, to all or virtually all class members." Rail Freight III, 287 F.R.D. at 28; see also id. at 49 ("[D]efendants' class period fuel surcharges . . . were standardized and uniformly applied across all or virtually all shippers . . . ."). Despite this history, the D.C. Circuit characterized the Court's first class certification analysis with respect to uninjured class members as "center[ing] on . . . whether the plaintiffs could show, through common evidence, injury in fact to all class members from the alleged price-fixing scheme . . . ." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 249 (emphasis added). But defendants never argued and the Court never considered whether plaintiffs needed to show injury to every last class member at the class certification stage.

In determining whether to grant an interlocutory appeal in this case, the D.C. Circuit stated that to meet the predominance requirement on remand, "[t]he plaintiffs must also show that they can prove, through common evidence, that all class members were in fact injured

by the alleged conspiracy." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252 (citing Amchem Prods., Inc. v. Windsor, 521 U.S. at 623-24). It further explained by stating:

> Otherwise, individual trials are necessary to establish whether a particular shipper suffered harm from the price-fixing scheme. That is not to say the plaintiffs must be prepared at the certification stage to demonstrate through common evidence the precise amount of damages incurred by each class member. But we do expect the common evidence to show all class members suffered some injury.

Id. (emphasis in original) (internal citation omitted).

The D.C. Circuit relied upon Amchem Products, Inc. v. Windsor as the only doctrinal support for its conclusion that plaintiffs must show that they can prove injury to all putative class members. In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252. In Amchem Products, Inc. v. Windsor, the Supreme Court addressed the question of whether plaintiffs in a mass tort asbestos case had satisfied Rule 23(b)(3)'s predominance requirement in the context of a settlement class action under Rule 23(e). 521 U.S. at 623-25. The Court in Amchem found predominance lacking because a "great[] number of questions peculiar to the several categories of class members" existed by virtue of the uniquely "sprawling" mass tort settlement class at issue. Id. at 624. The Court further distinguished putative mass tort class actions from "cases alleging consumer or securities fraud or violations of the antitrust laws" where Rule 23(b)(3) "[p]redominance is a test readily met." Id. at 625. It said nothing about the need to prove that all class members were injured.

Following the D.C. Circuit's remand in this case, the Supreme Court granted certiorari in Tyson Foods, Inc. v. Bouaphakeo to address whether a class may be certified or maintained under Rule 23(b)(3) when the class consists of some uninjured class members. See Petition for Writ of Certiorari at i, Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. 1036

(No. 14-1146). The Court ultimately did not answer the uninjured class members question because it determined that the question of whether uninjured class members may recover was not yet "fairly presented by th[e] case," inasmuch as the "damages award has not yet been disbursed, nor does the record indicate how it will be disbursed." Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. at 1050. In Tyson Foods, the court of appeals had affirmed the district court's denial of defendants' motion to set aside a jury verdict in plaintiffs' favor, id. at 1044, a decision that was made well after the district court had certified the class. The Supreme Court explained why in that posture it was premature to decide the uninjured class members question:

> Whether that or some other methodology will be successful in identifying uninjured class members is a question that, on this record, is premature. [The defendant] may raise a challenge to the proposed method of [damages] allocation when the case returns to the District Court for disbursal of the [damages] award.

Id. at 1050. Tyson Foods does not offer controlling guidance for how the Court should resolve the uninjured class members question in this case.

The Court understands the D.C. Circuit's opinion in this case to mean that plaintiffs must show that they "can prove, through common evidence" that "all class members suffered some injury" — not that the common evidence already has shown such injury. In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252 (emphasis added); see also supra at 106 (discussing that plaintiffs need only prove that the elements of their claim are capable of proof at trial). This is not a demand for present proof of injury to each and every class member, but rather proof of a reliable means for demonstrating "that all class members" who will ultimately recover damages "were in fact injured by the alleged conspiracy." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252. It follows

that the presence of some number of uninjured class members at the class certification stage does not categorically bar a finding of predominance under Rule 23(b)(3).

In its initial class certification opinion, the Court relied in part on Fifth and Seventh Circuit precedent to determine that the existence of uninjured members does not defeat class certification where plaintiffs "can show widespread injury to the class." Rail Freight III, 287 F.R.D. at 40 (quoting Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. at 310); see also Mims v. Stewart Title Guar. Co., 590 F.3d at 308; Kohen v. Pac. Inv. Mgmt. Co., 571 F.3d at 677. In its opinion, the D.C. Circuit rejected the Court's reliance on those cases. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 255. The Court therefore must determine the proper standard to apply when considering whether the number of uninjured members defeats a showing of predominance.

2. "All or Virtually All" Standard: A De Minimis Number of Uninjured Class Members. A number of other circuit and district courts have addressed the question of uninjured class members at class certification post-Comcast and post-In re Rail Freight Fuel Surcharge Antitrust Litigation — MDL No. 1869. The First Circuit reads the D.C. Circuit's opinion to mean "that at the class certification stage, plaintiffs must 'show that they can prove' — not that they have proved — 'through common evidence, that all class members were in fact injured . . . .'" In re Nexium Antitrust Litig., 777 F.3d at 24 n.20 (emphasis in original) (quoting In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252). The First Circuit further explained:

> In certifying a (b)(3) class there is an almost inevitable tension between excluding all non-injured parties from the defined class and including all injured parties in the defined class. Ideally, that tension should be resolved by adopting a class definition that includes no uninjured parties and excludes no injured parties. We doubt that this will be feasible in many cases. Without the benefit

> of further proceedings, it is simply not possible to entirely separate the injured from the uninjured at the class certification stage.

Id. at 22 (internal citation omitted). The First Circuit also noted that the Supreme Court in Comcast "did not require that plaintiffs show that all members of the putative class had suffered injury at the class certification stage . . . ." Id. at 23. The First Circuit therefore held that "a certified class may include a de minimis number of potentially uninjured parties," id. at 25, because "it does not follow that the existence of a de minimis number of uninjured class members bars certification if those members can be weeded out at a later stage." Id. at 24 n.20. The Sixth Circuit similarly explained that "the D.C. Circuit did not alter the normal rule that named plaintiffs need only show at the class-certification stage 'that they can prove, through common evidence, that all class members were in fact injured by the alleged conspiracy,' not that they have in fact proved that injury." Rikos v. Procter & Gamble Co., 799 F.3d 497, 522 (6th Cir. 2015) (emphasis in original) (quoting In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252), cert. denied, 136 S. Ct. 1493 (2016).

The Ninth Circuit in Torres v. Mercer Canyons Inc. held that "fortuitous non-injury to a subset of class members does not necessarily defeat certification of the entire class, particularly as the district court is well situated to winnow out those non-injured members at the damages phase of the litigation, or to refine the class definition." 835 F.3d 1125, 1137 (9th Cir. 2016) (citing RUBENSTEIN, supra, § 2:3). The Court explained that, "pursuant to Rule 23, 'the court's task at certification is to ensure that the class is not defined so broadly as to include a great number of members who for some reason could not have been harmed by the defendant's allegedly unlawful conduct.'" Id. at 1138 (quoting RUBENSTEIN, supra, § 2:3); see also In re Lidoderm Antitrust Litig., 2017 WL 679367, at *11 ("[E]ven if defendants could definitively show at this juncture that there are [putative class members] who were not harmed yet are

included within the . . . class definition[,] . . . such overinclusiveness would not defeat class certification as long as the uninjured parties represent a de minimis portion of the class."). The Fifth Circuit also has stated that "class certification is not precluded simply because a class may include persons who have not been injured by the defendant's conduct. . . . [T]he possibility that some [absent class members] may fail to prevail on their individual claims will not defeat class membership." In re Deepwater Horizon, 739 F.3d 790, 813 (5th Cir. 2014) (internal quotation marks and citations omitted).

Several district court judges in the Second Circuit also have found Rule 23(b)(3) predominance satisfied despite the presence of uninjured class members at the class certification stage. Judge Cote in In re Electronic Books Antitrust Litigation explained that "it is widely recognized" that "a class will often include persons who have not been injured by the defendant's conduct" and that "[s]uch a possibility or indeed inevitability does not preclude class certification." No. 11-2293, 2014 WL 1282293, at *22 (S.D.N.Y. Mar. 28, 2014) (citation omitted); see also Dial Corp. v. News Corp., 314 F.R.D. 108, 120 (S.D.N.Y. 2015), amended, No. 13-6802, 2016 WL 690895 (S.D.N.Y. Feb. 9, 2016) ("[T]he fact that some putative class members may be uninjured does not automatically defeat predominance."). Another court has characterized plaintiffs' burden at the class certification stage as "demonstrating that common evidence is capable of establishing that all or virtually all potential class members" were injured. In re Air Cargo Shipping Servs. Antitrust Litig., 2014 WL 7882100, at *45.

The Court views the "all or virtually all" and the "de minimis" standards as two sides of the same coin. If the putative class includes only a de minimis number of uninjured members, then plaintiffs have satisfied the all or virtually all standard for predominance and have demonstrated that they can prove class-wide injury through common evidence at trial. See De

minimis, BLACK'S LAW DICTIONARY (9th ed. 2009) (a fact or thing "so insignificant that a court may overlook it in deciding an issue or case"). As the First Circuit noted, "the need for individual determinations or inquiry for a de minimis number of uninjured members at later stages of the litigation" does not mean that individual questions will predominate over common ones. In re Nexium Antitrust Litig., 777 F.3d at 21. The Court therefore concludes that all that is required to satisfy Rule 23(b)(3)'s predominance requirement for purposes of certification of the class is to show by a preponderance of the evidence that injury to "all or virtually all" putative class members can be proved through common evidence and that plaintiffs have a reliable way to ensure that all class members suffered some injury by the time the Court awards damages.

3. Number of Uninjured Shippers. The next question is whether the number of uninjured shippers in the putative class in this case can be considered de minimis. As an initial matter, the Court first must determine the aggregate number of shippers in the class in order to measure the percentage or magnitude of uninjured shippers. In his Class Reply Report, Dr. Rausser stated that the plaintiff class included approximately 30,000 shippers. See Rausser Class Reply at 15 (finding "more than 30,000 shippers with unregulated shipments during the Class Period"); see also id. at 5. As Dr. Kalt points out, however, the data in Dr. Rausser's Supplemental Reply Report "include only about 16,000 class shipper names," not 30,000, as Dr. Rausser had originally said. Kalt Class Rep. ¶ 73 n.103. In his Supplemental Reply Report, Dr. Rausser performs calculations on the number of uninjured shippers and mentions 16,065 as the total number of shippers. See Rausser Supp. Reply at 113, 116. Dr. McClave also stated in his Supplemental Report that the putative class has a total of over 16,000 members. McClave Supp. Rep. at 18. Dr. Kalt suggests that the 16,000-shipper figure is the correct figure because

Dr. Rausser found a 30,000-shipper figure when he "selected the wrong name field" in the software he used to sort and test defendants' transaction data. Kalt Class Rep. ¶ 73 n.103. The Court finds that the putative class contains no more than 16,065 shippers because Dr. Rausser's latest expert report uses that figure. Rausser Supp. Reply at 113, 116.[44]

Of the 16,605 shippers in the class, Dr. Kalt found that 4,550 shippers — or 28.3% — have net negative overcharges across all of their shipments, even though some of those shipments had positive overcharges. See Kalt Class Rep. ¶ 73 & Figure 13; see also Kalt Class Sur-Reply ¶ 46. Dr. Kalt also found that 2,679 shippers have only negative overcharges across all of their shipments. Kalt Class Rep. ¶ 74 & Figure 13. The Court finds that Dr. Kalt's first calculation — net negative overcharges — is not a probative metric for calculating the number of uninjured class members. The Court concludes that even a single shipment with a positive overcharge to a particular shipper is sufficient to show injury to that shipper. After all, as defendants acknowledge, the plaintiff class consists of injured shippers, not the number of affected shipments. See Class Certification Hr'g Tr. (Sept. 27, 2016) at 247 (defendants' counsel agreeing that, "[f]or the purposes of common impact," the proper metric is "shippers, not shipments"). The Court agrees with the reasoning of the court in In re Air Cargo Shipping Services Antitrust Litigation that a single overcharge is sufficient to show injury to a particular plaintiff because:

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[44] In addition to Dr. Rausser's latest report, a practical basis for this finding is that Dr. Kalt adopted Dr. Rausser's 16,065 figure by using it as the denominator for his calculation of the percentage of uninjured class members. Kalt Class Rep. ¶ 73 n.103 ("For the purposes of testing [Dr.] Rausser's results and claims . . . I have accepted his [16,000] shipper designations."). To use any figure other than 16,065 would render those calculations meaningless.

> It is important to remember, however, that the plaintiffs do not have to show that each class member suffered an overcharge on each and every purchase they made. Rather, it is enough if they provide sufficient evidence to demonstrate that substantially all class members were overcharged at least once. Thus, even if many class members were able to avoid an overcharge on some, or even many, transactions through negotiations or because of other factors, they are still victims of the alleged price-fixing conspiracy and proper class members if they paid a supra-competitive price on a single transaction.

2014 WL 7882100, at *45; see also In re Nexium (Esomeprazole) Antitrust Litig., 297 F.R.D. 168, 179 (D. Mass. 2013) (same), aff'd, In re Nexium Antitrust Litig., 777 F.3d 9; In re Chocolate Confectionary Antitrust Litig., 289 F.R.D. 200, 221 (M.D. Pa. 2012) (same).

This logic dictates that a shipper is injured — and therefore is a legitimate member of the plaintiff class — even if it has only one positive overcharge alongside (for example) nine negative overcharges because, in the absence of the conspiracy, the shipper would not have suffered the one overcharge. The Court therefore places no weight on the calculation of the number of shippers with net negative overcharges by Dr. Kalt or any other expert witness. It is only those shippers who have negative overcharges for every single one of their class period shipments that are truly uninjured.

So how many shippers can be considered uninjured under this formulation? Dr. Rausser stated in his Supplemental Reply Report that "2,037 out of 16,065" shippers have only negative overcharges. Rausser Supp. Reply, Table 27.[45] Dr. Kalt says that 2,679 shippers have only negative overcharges across all of their shipments. See Kalt Class Rep., Figure 13.

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[45] Dust Pro, Inc., a named plaintiff, is one of the class members with only negative overcharges across all of their shipments. See Rausser Supp. Reply, Table 22. The Court previously designated Dust Pro, Inc. as a class representative. Rail Freight III, 287 F.R.D. at 74. Whether Dust Pro, Inc. should remain a named plaintiff that represents the class in this case is outside the scope of the present motion for class certification.

The reason for the difference between Dr. Kalt's 2,679 figure and Dr. Rausser's 2,037 figure is that Dr. Kalt "multiplie[d] predicted but-for prices" in Dr. Rausser's model "by a factor of 1.037" before attempting to locate shippers with only negative overcharges, Rausser Supp. Reply at 109 n.356, which Dr. Kalt described at the class certification hearing as his "alpha adjustment." Class Certification Hr'g Tr. (Sept. 29, 2016) at 954.

Depending on which of those two figures one uses — Dr. Rausser's or Dr. Kalt's — those shippers that have only negative overcharges across all of their shipments account for either 12.7% or 16.7% of all class members. See McClave Merits Rep. at 13-14; Kalt Class Rep., Figure 13. Therefore, either 87.3% or 83.3% of class members have at least one shipment affected by defendants' alleged anti-competitive conduct and thus have been injured by the antitrust conspiracy. Using Dr. Rausser's lower figure, the question is whether injury to 87.3% of class members meets the "all or virtually all" standard for predominance under Rule 23(b)(3) and the case law. Or to put it another way: if a de minimis number of uninjured class members at the class certification stage does not preclude a finding of predominance, can 12.7% of the class who are uninjured be considered de minimis under the case law?

There are only a few reported decisions in which courts have discussed this issue in concrete terms, but the ones that have suggest that 5% to 6% constitutes the outer limits of a de minimis number of uninjured class members. Compare In re Lidoderm Antitrust Litig., 2017 WL 679367, at *12 (finding that three uninjured class members out of a class totaling fifty-five members (5.5%) is de minimis), and In re Nexium (Esomeprazole) Antitrust Litig., 297 F.R.D. at 179 (concluding that a proposed class with at least 5.8% uninjured members did not defeat predominance), with Vista Healthplan, Inc. v. Cephalon, Inc., No. 06-1833, 2015 WL 3623005, at *20 (E.D. Pa. June 10, 2015) (concluding that a proposed class with approximately 5%

uninjured class members combined with the "substantial likelihood" that more class members were also uninjured "indicates that the prevalence of uninjured class members is more than de minimis"). Plaintiffs' proposed class includes more uninjured members — 12.7% under Dr. Rausser's damages model — than any of these reported decisions.

Beyond percentages, the number of uninjured class members in relationship to the size of the class also may matter. In In re Lidoderm Antitrust Litigation, there were only three, clearly identifiable uninjured class members out of a class totaling only fifty-five. 2017 WL 679367, at *12. It is perfectly reasonable that the court there could "back out" the uninjured members. In contrast, it would be far more difficult for a court to "weed out" over 2,000 uninjured class members — or some subset of that number — from a class of over 16,000. See In re Nexium Antitrust Litig., 777 F.3d at 24 n.20 ("[T]he existence of a de minimis number of uninjured class members [does not bar] certification if those members can be weeded out at a later stage."). The Court finds that the presence of 2,037 uninjured class members in this case — 12.7% of the class — is beyond the outer limits of what can be considered de minimis for purposes of establishing predominance. Absent some further way to reduce this number and segregate the uninjured from the truly injured, the Court cannot find that "all or virtually all" class members were injured under the predominance prong of Rule 23(b)(3).

4. Prediction Error. Plaintiffs and Dr. Rausser maintain that the presence of 2,037 uninjured class members can be explained by prediction error. Pls. Supp. Reply at 33-37. Their presence therefore should not undermine the Court's confidence in the reliability of Dr. Rausser's damages model or lead the Court to conclude that too many "individualized inquiries [are required] about who was injured, who was not" to preclude a finding of predominance. Defs. Supp. Opp. at 22; see also Class Certification Hr'g Tr. (Sept. 26, 2016) at

140; Pls. Supp. Reply at 34-37. Dr. Rausser says that every regression model will have some degree of prediction error, see Class Certification Hr'g Tr. (Sept. 27, 2016) at 377-78, and Dr. Kalt agrees with this general proposition. Kalt Class Sur-Reply ¶ 48. Dr. Rausser and Dr. McClave conclude that prediction error is the reason why Dr. Rausser's model found slightly over 2,000 uninjured shippers, Rausser Supp. Reply at 105-06; Class Certification Hr'g Tr. (Sept. 28, 2016) at 617-18, when in fact many — perhaps even all — of these shippers were injured by the conspiracy. Rausser Supp. Reply at 107; McClave Supp. Rep. at 18-19.

Plaintiffs argue that "prediction error is far more likely to have an effect where there are far fewer numbers of transactions." Pls. Supp. Reply at 35. The smaller number of observations for certain class members in Dr. Rausser's regression model results in genuinely injured shippers appearing to be uninjured in the model — that is, prediction error. Id. Dr. Rausser explains that because the shippers that are shown to be negatively impacted in his damages model are mostly small shippers with very few shipments, prediction error is more likely to effect the accuracy of the model as to them. Rausser Supp. Reply at 106-08. "[T]he instances of negative damages," he says, "are overwhelmingly associated with shippers with few shipments" — making them the most likely to be susceptible to prediction error. Id. at 109; see also id., Figures 24, 25, 29; Class Certification Hr'g. Tr. (Sept. 27, 2016) at 378. Dr. McClave agrees, opining that Dr. Rausser's damages model is less able to capture the exact injury for shippers with a small number of shipments and concluding that the findings of uninjured shippers are likely the result of prediction error. Class Certification Hr'g Tr. (Sept. 28, 2016) at 617-18. He explains that "for small samples, namely, in this case, shippers [who] have small numbers of transactions. That's where prediction errors more likely raise its ugly head than if I

have a thousand shipments for a shipper . . . . That's going to tend to be less of a factor . . . in large samples." Id. at 614.

Dr. Rausser calculated that of the 2,037 uninjured shippers he identified, "over 95% have [fewer] than 10 shipments in the Class Period" and "at least 50% of these shippers have only a single shipment during the Class Period." Rausser Supp. Reply at 116-17; see also id., Figures 28 & 29. Dr. Rausser concludes that it is "more reasonable" to attribute the model's findings of uninjured shippers to prediction error, rather than to conclude that these small shippers somehow "escap[ed] common impact." Id. at 107. Based on the opinions of Dr. Rausser and Dr. McClave, plaintiffs maintain that there are many fewer shippers who are uninjured than the model shows and that a small number of uninjured class members does not undermine the reliability of the class-wide overcharge estimates produced by Dr. Rausser's damages model. Pls. Supp. Reply at 35-37.[46]

Dr. Kalt argues that normal prediction error cannot possibly "rationalize away" so large a number of "uninjured shipments." Kalt Class Sur-Reply ¶ 47; see also id. ¶¶ 48-52. He also states that "normal prediction error" should be no more than 2.5%, Class Certification Hr'g Tr. (Sept. 29, 2016) at 864, and that if negative damages were the result of "random prediction error," only 5% of shippers would be expected to have the number of shipments with negative

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[46] While not doctrinally significant, the Court also notes that permitting some uninjured class members at the class certification stage is consistent with the reality of having to use a regression model to prove class-wide injury. Regression analysis is always subject to prediction error, meaning that "no matter how much data we have, we can never predict perfectly." See GREENE, supra, at 121; see also Kalt Class Sur-Reply ¶ 48; Class Certification Hr'g Tr. (Sept. 29, 2016) at 864 (Dr. Kalt testified that "no model fits perfectly; it's going to have prediction error"). In other words, even if, as here, a regression includes all transaction data such that it reflects a complete picture of the population it intends to analyze — i.e., no sampling error — there will always be the chance for outlier results. GREENE, supra, at 121.

damages above or below certain limits. Kalt Class Sur-Reply ¶¶ 47, 64 & n.117; see also id. ¶¶ 48-52.[47] In responding to Dr. Rausser's prediction error theory, Dr. Kalt returns to his net negative overcharges analysis and concludes that Dr. Rausser's model reports negative overcharges for 28% of class shipments, showing that 28% of class shipments were uninjured. As the Court already has discussed, however, see supra at 190-91, this is an unhelpful metric for resolution of the uninjured shippers issue.

The Court concludes, however, that prediction error cannot explain away the presence of even 12.7% of the class who are shown as uninjured shippers in Dr. Rausser's damages model. See Kalt Class Sur-Reply ¶¶ 47-60. Prediction error certainly could account for a limited number of shippers who were in fact injured even though the damages model indicates that they are uninjured. But neither Dr. Rausser nor plaintiffs explain how normal prediction error with respect to shippers with a small number of shipments can account for all — or even a substantial portion of — the 2,037 shippers that the model shows to be uninjured. Nor do Dr. Rausser or Dr. McClave try to quantify what number or percentage of shippers are actually uninjured or propose how to identify and separate the truly uninjured from the genuinely injured. They simply assert that all 2,037 shippers are in fact injured. Pls. Supp. Reply at 34-38. Indeed, Dr. McClave boldly concludes:

> Furthermore, my results when viewed in concert, . . . show that all or virtually all class members were impacted by the conspiracy. It is reasonable, in fact, to conclude that all class members were impacted, since those having few transactions are not only subject to more random variability but also would be expected to have the least bargaining power with the Defendants — a fact that makes it

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[47] Dr. Rausser agrees that there could be a 2.5% "margin of error," and that this leads to prediction error, Rausser Supp. Reply at 108, 125, but he says Dr. Kalt draws "unreliable conclusions" regarding the reliability of Dr. Rausser's damages model and whether shippers suffered a common impact. Id. at 125.

> implausible to assume that small shippers would have escaped the impact of a conspiracy that affected virtually all large shippers.

McClave Supp. Rep. at 18-19. Even accounting for prediction error, the Court finds that there is no principled way to conclude that all — or even substantially all — of the roughly 2,000 class members for whom the model shows no injury were in fact injured.

With respect to the shippers which the model shows to be uninjured, both Dr. Rausser and Dr. Kalt were able to do in-depth analyses of how many shippers have no uninjured shipments (2,037 or 2,679), were able to identify those shippers, and were able to specify how many shipments each of those shippers had. See Rausser Supp. Reply at 108-19 & Figures 28, 29; Kalt Class Rep. ¶¶ 73-74 & Figure 13. Dr. Kalt's uninjured class members exercise also demonstrates that Dr. Rausser's damages model has sufficient data for him to examine whether the named plaintiffs had shipments with negative overcharges. Kalt Class Rep. ¶ 79 & Figure 16. The ability of Dr. Kalt and Dr. Rausser to undertake such granular analyses indicates that plaintiffs could, at a minimum, determine exactly which shippers have only shipments with negative overcharges during the class period and how many shipments they had. But in the end, Dr. Rausser's expert work ultimately is unhelpful to plaintiffs' predominance argument.

Because the Court has found that prediction error cannot possibly support the conclusion that all 2,037 "uninjured shippers" were in fact injured, the question is whether plaintiffs have proposed any method by which to determine which of the purportedly 2,037 uninjured shippers were actually injured and which were not. More specifically, have they suggested a methodology to determine who is a proper class member and who is not that does not require an individualized inquiry for each of these 2,037 shippers? Dr. Rausser testified that "there are sound methodologies, various methodologies for dealing with prediction errors which

would show, for example, that a particular small shipper suffered no damages when, in fact, they did suffer damages." Class Certification Hr'g Tr. (Sept. 27, 2016) at 378. But he has not explained what those methodologies are or how they would identify and separate the injured from the uninjured. Nor has he empirically tested this thesis on the "uninjured shippers" in his model. The Court therefore finds that plaintiffs have proposed no method for identifying and removing uninjured shippers from the class through the use of common evidence. As such, there would need to be individualized inquiries to determine which of at least 2,037 (and possibly more) class members were actually injured by the alleged conspiracy — the central issue of each plaintiff's claim. See Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. at 1045 (internal quotation marks and citation omitted) ("The predominance inquiry asks whether the common, aggregation-enabling, issues in the case are more prevalent or important than the non-common, aggregation-defeating, individual issues."); see also Vista Healthplan, Inc. v. Cephalon, Inc., 2015 WL 3623005, at *19, 21; Sheet Metal Workers Local 441 Health & Welfare Plan v. Glaxosmith Kline, No. 04-5898, 2010 WL 3855552, at *25 (E.D. Pa. Sept. 30, 2010). The Court therefore concludes that the individualized inquiries that will be necessary to determine the members of the proposed class predominate over common questions of fact and law and therefore preclude a finding of predominance.

5. Injured Class Revenue. Separate from their de minimis and related prediction error arguments, plaintiffs have a stand-alone alternative argument for how the Court should determine whether all or virtually all class members were injured. Rather than looking at the number or percentage of uninjured shippers, they look at the number of class shipments and the revenue that the uninjured shippers generated. Dr. Rausser states that the 2,037 uninjured shippers account for only 5,174 of 5,392,354 total shipments during the class period and only

0.04% of overall class revenue. Rausser Supp. Reply at 115-16 & Table 27. Thus, the uninjured shippers account for a vanishingly small number of class period shipments and a miniscule percentage of class period revenue (only 0.04%). Id., Table 27. With injured shippers — that is, shippers that have at least one affected shipment — accounting for 99.6% of class revenue, plaintiffs argue that the predominance test of Rule 23(b)(3) is easily met. See Pls. Supp. Reply at 34.

Dr. McClave's customer indicator variable exercise provides additional support for Dr. Rausser's conclusion that the uninjured class members are generally small shippers with limited transactions and class period revenue. For his customer indicator exercise, Dr. McClave examined shippers with at least two transactions during the class period, which is roughly 11,000 shippers. McClave Merits Rep. at 14. He concluded that 96% of those customers have one positive overcharge and that those shippers account for 99.8% of defendants' class period revenue. Id. at 15. From his customer indicator exercise, Dr. McClave concludes that "all or nearly all customers were impacted by the [alleged] conspiracy." Id. at 13.

The Court finds plaintiffs' alternative class revenue approach unpersuasive. First, the "all or virtually all" standard seeks to determine whether there is common impact among class members, not how much revenue was affected by the alleged conspiracy. As defendants note, it is an apples-to-oranges comparison to look at how much class revenue was affected in order to conclude whether all or virtually all class members were injured. Class Certification Hr'g Tr. (Sept. 27, 2016) at 249. Further, in order to conclude that 99.96% of class revenue was impacted, Dr. Rausser looks at how many shippers have one positive overcharge and then includes all of that shipper's revenue during the class period, not just the revenue from injured shipments. See id. at 245-46; Rausser Supp. Reply at 105, 115 & Table 27. Dr. Rausser

therefore pools revenue from both injured and uninjured shipments in order to conclude that 99.96% of class revenue was affected by the alleged conspiracy.

Second, the notion that the uninjured members in this proposed class account for a small number of class shipments and a small portion of class revenue does not answer the question of whether there are a de minimis number of uninjured class members such that any individualized inquires will not overwhelm the issues common to the class. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252. Plaintiffs' insistence that the uninjured members are in fact injured emphasizes that individualized inquiries will be necessary for at least 2,037 class members at a later stage in this litigation. The Court therefore is not persuaded that class revenue is a legitimate measure of injury to satisfy predominance.

For these reasons, the Court concludes that plaintiffs have failed to establish that all or virtually all class members were injured by the alleged conspiracy. Dr. Rausser's damages model indicates that at least 12.7% of class members — or at least 2,037 shippers — are uninjured. This is more than de minimis and insufficient to demonstrate impact on a class-wide basis.

C. Damages

The third element that plaintiffs must prove is measurable damages. See In re High-Tech Emp. Antitrust Litig., 985 F. Supp. 2d at 1183; In re Processed Egg Prods. Antitrust Litig., 312 F.R.D. at 202-03. The element of damages is distinct from impact: impact asks "whether the plaintiffs were harmed," whereas "damages quantify by how much." In re Ethylene Propylene Diene Monomer (EPDM) Antitrust Litig., 256 F.R.D. at 88 (emphasis in original) (citation omitted). As such, the central question is whether plaintiffs have established by a preponderance of the evidence that "there is a classwide method for proving damages, and if not,

whether individual damage determinations will overwhelm the common questions on liability and impact." Kleen Prods. LLC v. Int'l Paper Co., 831 F.3d at 929; see In re Processed Egg Prods. Antitrust Litig., 312 F.R.D. at 202-03 (citation omitted).

Defendants argue that the Supreme Court in Comcast "instructed lower courts not to certify class actions unless and until common proof of damages survives 'rigorous' scrutiny." Defs. Supp. Opp. at 74 (citation omitted). They also say "it is crystal clear that [Comcast] is referring to measuring individual damages, not some aggregate classwide number that then gets distributed arbitrarily." Id. at 75 (emphasis in original). The courts that have addressed the damages issues since Comcast have rejected the notion that Comcast includes such a stringent requirement. See, e.g., Kleen Prods. LLC v. Int'l Paper Co., 831 F.3d at 929; Roach v T.L. Cannon Corp., 778 F.3d 401, 407-08 (2d Cir. 2015); In re Deepwater Horizon, 739 F.3d at 815. The D.C. Circuit has stated that plaintiffs need not "be prepared at the class certification state to demonstrate through common evidence the precise amount of damages incurred by each individual class member." In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 252; see also Kleen Prods. LLC v. Int'l Paper Co., 831 F.3d at 929 (noting that "plaintiffs are not obliged to drill down and estimate each individual class member's damages" if they possess a reliable method of proving class-wide damages at the class certification stage). Nor does the presence of individualized damages preclude class certification. In re Deepwater Horizon, 739 F.3d at 815; see also Leyva v. Medline Indus. Inc., 716 F.3d 510, 514 (9th Cir. 2013) ("[T]he presence of individualized damages cannot, by itself, defeat class certification under Rule 23(b)(3)."); 7AA CHARLES ALAN WRIGHT, ARTHUR R. MILLER & MARY KAY KANE, FEDERAL PRACTICE AND PROCEDURE § 1781 (3d ed. 2017) ("[I]t uniformly has been held that differences among the members as to the amount of damages incurred does not mean that a class

action would be inappropriate."). At this stage, therefore, the Court must determine whether plaintiffs have shown by a preponderance of the evidence that there is a reliable means of proving class-wide damages. See In re Processed Egg Prods. Antitrust Litig., 312 F.R.D. at 202-03.

Plaintiffs rely on Dr. Rausser's damages model first to show that class-wide damages can be estimated. See Pls. Supp. Mem. at 64, Pls. Supp. Reply at 40. They also maintain that the same model could later be used to calculate and apportion class-wide damages among individual class members. Pls. Supp. Mem. at 64. Dr. Rausser's damages methodology "pertains to all-in rates, . . . and estimates how much those all-in rates increased as a result of Defendants' [allegedly] conspiratorial conduct." Rausser Merits Rep. at 171. "The percentage overcharge due to the alleged conspiracy can be calculated using the regression model to compare freight rates in the Class Period to those in the pre-Class Period, while using the Defendants' transaction data and publicly available data to account for the other predominating common economic forces that determine prices." Id. at 164. Because the fuel surcharges were linked to fuel prices, "which vary each week, the conspiratorial overcharge is expected to differ" from week to week. Id. at 171. Using 100% of defendants' transaction data, Dr. Rausser has estimated the overcharge for each week of the class period. Id. The average of those weekly overcharges is 9.8%. See Rausser Supp. Reply at 47; Class Certification Hr'g Tr. (Sept. 27, 2016) at 377.[48] Dr. Rausser computed "[c]lass-wide damages . . . by applying each week's overcharge percentage to the gross revenue paid . . . to the Defendants by Class members in that

[48] This average weekly overcharge of 9.8% is based on Dr. Rausser's most recent damages model. The average weekly overcharge has changed as Dr. Rausser has updated his damages model. In his Merits Report, Dr. Rausser calculated an average weekly overcharge of 13.6%. Rausser Merits Rep. at 171.

same week." Rausser Merits Rep. at 171. The result of those calculations was a total damages figure attributable to each of the four defendants in each year during the class period (2003 to 2008). Rausser Merits Reply at 250-51 & Table 105. Dr. Rausser calculates the total amount of damages to be $7.9 billion. Id.

Based on the Court's conclusions regarding whether Dr. Rausser's damages model is reliable in helping to prove common impact, there are three key issues that also bear on whether Dr. Rausser's damages model is a reliable means of assessing class-wide damages. First, the Court determined that Dr. Rausser's damages model shows hundreds of millions of dollars in overcharges for intermodal shippers and that those overcharges are unsupported by plaintiffs' theory of liability. See supra at 166-73. As the Court noted, plaintiffs have offered no reliable evidence to explain how intermodal shippers experienced hundreds of millions of dollars in overcharges, when defendants never changed the intermodal fuel surcharge formulas. See supra at 171-72. Plaintiffs' only response — that intermodal shippers suffered over $800 million in overcharges from defendants' aggressive enforcement of fuel surcharges — is "completely untethered to the evidence." Class Certification Hr'g Tr. (Sept. 26, 2016) at 192.

Second, Dr. Rausser's damages model shows overcharges for legacy shippers. The damages model shows an average weekly overcharge of 9.7% for legacy shipments, nearly identical to the average weekly overcharge of 9.8% for class shipments. Kalt Class Rep. ¶ 6. Plaintiffs assert that the alleged conspiracy "impacted all contracts, including legacy contracts." Pls. Supp. Mem. at 27; see also supra at 173-82. On remand, Dr. Rausser states that all legacy shippers were harmed by the alleged conspiracy because (1) a majority of the legacy shippers were not "true" legacies because those shippers were not bound by rates negotiated before the start of the alleged conspiracy, see Rausser Supp. Rep. at 6, and (2) the change in economic

environment during the class period prevented legacy shippers from renegotiating their contracts as fuel prices (and fuel surcharges) rose. Id. at 5, 7-11. The Court already has found, however, that Dr. Rausser's expert opinion regarding legacy shippers simply is insufficient to establish that all or a substantial number of legacy shippers also were harmed by the alleged conspiracy. See supra at 173-82. The Court therefore concluded that plaintiffs have failed to establish that Dr. Rausser's damages model reliably shows overcharges for legacy shippers. See supra at 182.

With respect to intermodal shippers, the Court cannot be certain that the overcharges for carload shippers are accurate in the face of the massive overcharges Dr. Rausser's damages model finds for intermodal shippers that are unsupported by the evidence. With respect to legacy shippers, if the damages model also estimates overcharges for legacy shippers who were not harmed by the alleged conspiracy, then the Court cannot be certain that the overcharges that the damages model calculates for class members are accurate. See In re Rail Freight Fuel Surcharge Antitrust Litig. — MDL No. 1869, 725 F.3d at 254. The problems associated with overcharges for intermodal and legacy shippers — separately or together — show that Dr. Rausser's damages model is unreliable. The Court therefore concludes that plaintiffs have failed to establish that Dr. Rausser's damages model is a reliable means of assessing class-wide damages. This is fatal to plaintiffs' claim of predominance. See id. at 253.

Lastly, with respect to common impact, the Court has concluded that individual issues would predominate in determining whether the 2,037 putative class members for whom Dr. Rausser's damages model shows no injury were in fact injured. Just as plaintiffs have not offered any common evidence to determine which of these over 2,000 shippers is in fact injured, see supra at 197-98, they have not shown which of these shippers could prove damages at trial without requiring the Court or the jury to engage in individualized inquiries. The Court therefore

concludes that individual damages determinations for these class members would predominate over common issues. See Kleen Prods. LLC v. Int'l Paper Co., 831 F.3d at 929.

II. SUPERIORITY

The second requirement of Rule 23(b)(3) is superiority: a court must find "that a class action is superior to other available methods for fairly and efficiently adjudicating the controversy." FED. R. CIV. P. 23(b)(3); see Howard v. Liquidity Servs. Inc., 2017 WL 3948454, at *30; Coleman ex rel. Bunn v. District of Columbia, 306 F.R.D. at 87-88; Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. at 313. "The superiority requirement ensures that resolution by class action will 'achieve economies of time, effort, and expense, and promote . . . uniformity of decision as to persons similarly situated, without sacrificing procedural fairness or bringing about other undesirable consequences." Coleman ex rel. Bunn v. District of Columbia, 306 F.R.D. at 87-88 (alteration in original) (quoting Amchem Prods., Inc. v. Windsor, 521 U.S. at 615); see also Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. at 313 (citation omitted).

"Where there are many class members and common issues predominate, the superiority requirement is usually met." Fond du Lac Bumper Exch., Inc. v. Jui Li Enter. Co., No. 09-0852, 2016 WL 3579953, at *11 (E.D. Wis. June 24, 2016) (citing In re Ready-Mixed Concrete Antitrust Litig., 261 F.R.D. 154, 173 (S.D. Ind. 2009)). In contrast, when individual issues predominate, a class action will be deemed inferior. See McCarthy v. Kleindienst, 741 F.2d at 1415; Dover v. British Airways, PLC, --- F.R.D. ----, 2017 WL 1251083, at *7 (E.D.N.Y. Mar. 31, 2017) (citation omitted). "In other words, class actions are superior to individual trials 'when the main objectives of Rule 23 are served.'" In re Air Cargo Shipping Servs. Antitrust

Litig., 2014 WL 7882100, at *64 (quoting D'Alauro v. GS Servs. Ltd., 168 F.R.D. 451, 458 (E.D.N.Y. 1996)).

Defendants contest the superiority requirement on the same grounds as they contest predominance: they say that a class action is inferior because individual issues predominate regarding injury and damages. See Class Opp. at 74-75. Because the Court has concluded that plaintiffs have failed to meet the predominance requirement and that the proposed class action would require significant individualized inquiries regarding both injury and damages, it cannot conclude that a class action would be superior in this case. See McCarthy v. Kleindienst, 741 F.2d at 1415; Dover v. British Airways, PLC, 2017 WL 1251083, at *7.

CONCLUSION

For the foregoing reasons, the Court finds that plaintiffs have failed to establish each fact necessary to meet the requirements of Rule 23 of the Federal Rules of Civil Procedure by a preponderance of the evidence. Specifically, plaintiffs have failed to establish predominance and superiority under Rule 23(b)(3).

The Court therefore will deny the direct purchaser plaintiffs' motion for class certification [Dkt. 337]. The Court will not rule at this time on defendants' motion to exclude interline-related communications from consideration for class certification or for any other purpose [Dkt. 417].

This Opinion temporarily has been issued under seal in its entirety in view of the possibility that the Court has referenced "Confidential" or "Highly Confidential — Attorneys' Eyes Only" material, as described in the Protective Order issued in this case. See Protective Order (Jan. 29, 2009) ¶¶ 1.3, 1.4 (Facciola, Mag. J.) [Dkt. 195]. This Opinion, however, will not remain under seal. By separate Order, the Court is ordering the parties to meet and confer and

file a joint report by November 10, 2017, showing cause why this Opinion should not be published in full without redactions on the public docket of this Court.

If either party believes that some passage(s) in the Court's Opinion should be redacted, they must specify in the joint report which passage(s) and must specifically state the cause for each redaction. In making any such request, the parties are reminded that the courts are not intended to be, nor should they be, secretive places for the resolution of secret disputes. See, e.g., Metlife, Inc. v. Fin. Stability Oversight Council, 865 F.3d 661, 665 (D.C. Cir. 2017) (quoting United States v. Hubbard, 650 F.2d 293, 317 (D.C. Cir. 1980)) ("[T]here is a 'strong presumption in favor of public access to judicial proceedings.'"); Hardaway v. D.C. Hous. Auth., 843 F.3d 973, 980 (D.C. Cir. 2016). The parties are also reminded to consider what was previously published in the redacted version of the Court's initial class certification opinion. See Rail Freight III, 287 F.R.D. 1. Accordingly, any redactions shall be made solely to the extent necessary to preserve the confidentiality of the relevant information in accordance with the terms of the Protective Order issued in this case. See Protective Order ¶¶ 1.3, 1.4.

An Order consistent with this Opinion shall issue this same day.

SO ORDERED.

Paul L. Friedman

PAUL L. FRIEDMAN
United States District Judge

DATE: 10/10/17