

# Economics at the FTC: Fraud, Mergers and Exclusion

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**Abstract:** Economists at the Federal Trade Commission engage in economic analysis of a diverse set of behaviors, practices, and policies in support of the agency's consumer protection and competition missions as demonstrated by the four projects that are the focus of this article. Consumer protection economists provided economic analysis in the first two projects discussed, which both involve fraud. However, one of the projects was an enforcement action, and the other was a pure research project. The final two projects are antitrust matters: a proposed merger of software firms; and a case that was brought to stop anticompetitive exclusionary conduct.

**Keywords:** Antitrust, Consumer Protection, Fraud, Exclusionary Conduct, FTC, Mergers

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## I. Introduction

### A. The Bureau of Economics

The Bureau of Economics (BE) supports the Federal Trade Commission's (FTC's) consumer protection and antitrust activities by providing economic analysis for case work. It also advises the Commission and other government entities about the impact of government regulation on competition and consumer well-being, and analyzes economic phenomena in the nation's economy as they relate to antitrust and consumer protection (<https://www.ftc.gov/about-ftc/bureaus-offices/bureau-economics/about-bureau-economics>). BE's staff consists of roughly 80 Ph.D. economists, four financial analysts, nearly 20 research analysts who typically have undergraduate or masters economics degrees, and support staff.

BE plays three major roles at the FTC: The primary function of BE is to work with Commission attorneys on consumer protection and competition enforcement matters, and in particular, to provide economic analysis to better inform enforcement decisions. Second, the economists in BE are actively engaged in research that continually sheds light on agency-relevant issues.<sup>1</sup> Third, much of the policy and advocacy work (e.g., advising other government agencies on the competitive impact of policies under consideration) that is performed by economists at the FTC is a concerted effort with attorneys in the Office of Policy Planning, the Office of the General Counsel, the Bureau of Competition, and/or the Bureau of Consumer Protection.<sup>2</sup>

When working on law enforcement investigations, economists in BE typically provide their own independent economic analysis to the Commission. However, this analysis is greatly enriched by the interaction and cooperation between the economists and FTC attorneys from the Bureaus of Competition and Consumer Protection who work together to gather relevant information during the course of investigations. The economic analysis is an important input into decisions that have significant impact on consumers and businesses.

For instance, FTC consumer protection actions resulted in a total of \$642.4 million in ordered redress and disgorgement in calendar year 2014.<sup>3</sup> Furthermore, the FTC logged over 2.5 million consumer

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<sup>1</sup> Sometimes this research is part of large Commission studies that involve both legal and economic analysis. Examples of this are an ongoing study of Patent Assertion Entities, <http://www.ftc.gov/news-events/press-releases/2013/09/ftc-seeks-examine-patent-assertion-entities-their-impact> and a recently announced study of remedies in FTC merger cases, <https://www.ftc.gov/news-events/press-releases/2015/01/ftc-proposes-study-merger-remedies>. BE staff also work on more focused economics research projects that are often published in academic economics journals and/or released in the BE Working Paper series (<https://www.ftc.gov/policy/reports/policy-reports/economics-research/working-papers>).

<sup>2</sup> See, for instance, numerous advocacy comments at <https://www.ftc.gov/policy/advocacy/advocacy-filings>.

<sup>3</sup> See <https://www.ftc.gov/annual-highlights-2014/stats-data-2014>.

complaints that related to problems such as identity theft and imposter scams.<sup>4</sup> On the antitrust side, U.S. merger and acquisition activity quickened: 1,663 transactions were reported to the U.S. Department of Justice (DOJ) and the FTC in fiscal year 2014 – up from 1,326 in fiscal year 2013.<sup>5</sup> Only a small percentage of these resulted in the antitrust authorities undertaking a full phase investigation in which a “Second Request” for information is sent to the merging parties: The FTC issued 30 Second Requests, and the DOJ issued 21.<sup>6</sup> The FTC in FY2014 brought 17 merger enforcement actions, which consisted of 13 consent orders that permitted the merger to proceed subject to certain conditions; three transactions that were abandoned or restructured during the investigations; and the Commission filed a complaint in federal court to permanently enjoin one transaction. The FTC also brought eight non-merger antitrust enforcement actions in FY2014, six of which were resolved with consent agreements.<sup>7</sup>

BE continues to engage with the larger economics community by publishing research articles in academic journals, presenting original research at conferences, and maintaining an active seminar series. In addition, it organizes the annual FTC Microeconomics Conference, the seventh of which was held in October of 2014 in Washington, DC.<sup>8</sup> Paper sessions, panel discussions, and keynote addresses covered such topics as the impact of “big data” on consumers and firms; merger remedies; peer-to-peer Internet markets; and narrow healthcare networks. The next FTC Microeconomics Conference will again be in Washington, DC, on November 13-15, 2015.<sup>9</sup>

## B. Organization

The remainder of this article is divided into four sections: Each focuses on a specific matter that involved a variety of economic issues and analyses. The first section discusses two parallel consumer protection investigations of a practice that resulted in fraudulent, unauthorized charges being added to consumers’ mobile phone bills. A typical service was one that would send the consumer a daily horoscope or joke via text messaging, for which the consumer would be charged a monthly fee. These investigations resulted in settlements with AT&T and T-Mobile that required each carrier to pay at least \$90 million in refunds to consumers as well as civil penalties to the FCC and states. We describe reduced-form and structural econometric analysis that BE staff relied upon to estimate the consumer injury in these cases.

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<sup>4</sup> See <https://www.ftc.gov/annual-highlights-2014/stats-data-2014>.

<sup>5</sup> FTC & Department of Justice (2015).

<sup>6</sup> FTC & Department of Justice (2015) at 5.

<sup>7</sup> See <https://www.ftc.gov/competition-enforcement-database> for a table of these merger and non-merger enforcement statistics for each year starting in 1996.

<sup>8</sup> Conference materials can be found at <https://www.ftc.gov/news-events/events-calendar/2014/10/seventh-annual-federal-trade-commission-microeconomics>.

<sup>9</sup> For details, go to <https://www.ftc.gov/news-events/events-calendar/2015/11/eighth-annual-federal-trade-commission-microeconomics-conference>.

The second section summarizes the findings of a research project that was aimed at building upon extensive work that BE previously has done to investigate the prevalence of fraud by examining whether some of the determinants of susceptibility to fraud can be identified through the use of experimental methods. Subjects in the experiments were asked to assess a sequence of advertisements that contained claims of varying plausibility, and were asked to evaluate the ads. The study tested whether these assessments were correlated with various economic, psychological, and demographic measurements that were elicited from the subjects.

In the third section, we turn to our first of two antitrust matters: the Verisk/EagleView merger investigation. Verisk makes and markets software to insurance companies to help them prepare property insurance claims estimates. One of the inputs on which this software relies is an estimate of the size and shape of the roof of the insured building. EagleView developed and marketed software to estimate a roof's size and shape using overhead photographs, which allowed these estimates to be obtained without having to send an individual to perform a physical inspection. These products were complements; but Verisk also had developed software to estimate roof sizes from photographs, in direct competition with EagleView. We describe the economic analysis of that horizontal competition between the companies, and address the vertical issues that arose due to the complementary nature of the companies' original products.

The final section discusses the FTC's case against the North Carolina Board of Dentistry. This case made it to the Supreme Court, based on an important question regarding the legal requirements for actions of state governments to be exempt from federal antitrust enforcement. This was decided in the FTC's favor in February of 2015. However, a determination that an action is not exempt from the antitrust laws leaves open the question of whether the action is in violation of those laws. The FTC alleged that the dental board had violated Section 5 of the Federal Trade Commission Act by issuing cease-and-desist letters to non-dentist providers of teeth-whitening services. We discuss economic analysis that is relevant to the question of whether that action constitutes anticompetitive exclusionary conduct.

## II. Mobile Cramming: T-Mobile and AT&T

The FTC recently investigated and entered into settlements with T-Mobile and AT&T on charges of mobile payments fraud on their platforms.<sup>10</sup> This section summarizes the economic analysis that was conducted in these cases.

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<sup>10</sup> See *FTC v. T-Mobile, Inc.*, No. 2:14-cv-0097-JLR (W.D. Wash. Dec. 19, 2014) and *FTC vs. AT&T Mobility, LLC*, No. 1:14-cv-3227-HLM (N.D. Ga. Oct. 8, 2014).

## A. Background

The rise of mobile phones has enabled a new billing technology through mobile payments. Mobile billing allows consumers to pay for a service by charging the service to their mobile phone bill. The Premium SMS (PSMS) part of the mobile payments business was at issue in the T-Mobile and AT&T cases. In the PSMS market, consumers paid for premium text messages that were sent to their mobile phones by content providers from the provider's unique short code number; examples of these services included horoscopes and love-tips. Consumers supposedly authorized PSMS purchases through a double opt-in procedure. In the first stage, consumers provided a mobile phone number to indicate that they were interested in a service. The consumer then received a text message from the provider's short code and had to reply affirmatively to complete the authorization.

The PSMS market was set up in a three-part vertical structure: An aggregator acted as an intermediary between the content providers – who provided these horoscopes – and the carriers. The content provider was supposed to provide evidence of authorization to the aggregator, who processed the payment. The carrier then billed the consumer on their mobile phone bill.

The PSMS market was large, at perhaps \$2 to \$3 billion in annual sales at its peak; in California alone, PSMS sales were \$173 million in 2011 and \$191 million in 2012.<sup>11</sup> AT&T and T-Mobile typically received at least 35 percent of PSMS revenue.<sup>12</sup>

A number of fraudulent actors – known as “crammers” – have used Premium SMS billing to defraud consumers by charging for text message services that consumers did not authorize. These crammers either knowingly submitted charges that were unauthorized by consumers,<sup>13</sup> or obtained authorizations through deceptive means such as deceptive advertising. For an example of the latter, the Commission charged that advertisements for one content provider falsely claimed that consumers would receive free Justin Bieber tickets if they provided their mobile phone number.<sup>14</sup> Federal and state authorities have brought several mobile cramming cases against different content providers and aggregators in the past few years.

## B. Carrier Liability

While content providers are responsible and liable for unauthorized charges billed to consumers, at issue in these cases was whether the carriers should also be held liable. Holding carriers liable for unauthorized charges when there are clear warning signs of fraud is economically efficient for a number of reasons:

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<sup>11</sup> See California Public Utilities Commission (2013) and FTC (2014b).

<sup>12</sup> See *FTC v. T-Mobile, Inc* and *FTC vs. AT&T Mobility, LLC*.

<sup>13</sup> See *FTC v. Wise Media, LLC*, No. 1:13-cv-1234-WSD (N.D. Ga. Apr. 16, 2013).

<sup>14</sup> See *FTC v. Tatto, Inc.*, No. 2:13-cv-08912-DSF-FFM (C.D. Cal. Dec. 5, 2013).

First, to achieve effective deterrence and induce efficient behavior, it is important to hold carriers responsible for their actions. Crammers often have dissipated their assets by the time that they are held accountable, and entry into the cramming market is relatively costless. Thus, while the FTC and states brought cases against content providers for years, cramming continued to be a problem. In contrast, the major carriers are established companies, so effective deterrence is possible.

Second, because carriers have direct relationships with consumers, they will directly receive information to indicate that charges are unauthorized in the form of consumer complaints and refund requests. As a general matter, it is cost-effective from a social welfare standpoint for carriers to monitor this information for indications of unauthorized charges. Indeed, the information that was received by the carriers proved to be crucial for the econometric analysis that we conducted.

Third, the carriers have the ability to stop additional consumer harm easily once a crammer is identified.

Market incentives have not provided sufficient incentives for carriers to prevent cramming for two reasons: First, some consumers may have been unaware that the market exists, and may not have read or understood the payment disclosures in their mobile phone bill. As the complaints in both cases document, it was often difficult for consumers to understand that charges on their mobile phone bill were due to recurring PSMS subscriptions. Rational inattention on the part of some consumers, as in Sims (2003), thus could be exploited without adverse market reaction.

Second, other consumers could respond by asking for refunds or by switching mobile service.<sup>15</sup> Consumers receiving refunds would be compensated for at least part of their injury. Exit, on the other hand, would force consumers to incur considerable switching costs, which include early termination fees from breaking contracts and the costs of searching for a new provider. Since all four major carriers allowed PSMS billing, it would be difficult to determine ex-ante whether the new carrier had better practices on cramming. Thus, if the carriers chose to provide any amount of refund, they could mollify attentive consumers and retain their business while continuing to profit from the cramming of inattentive consumers.

### C. Reduced-Form Evidence

The data that were available to us for this analysis included measures of units sold, revenue, units refunded, and revenue refunded for various content providers by month and carrier. We used the refund rate as a measure of consumer dissatisfaction. A number of facts from these data indicated high levels of fraud in the PSMS marketplace.

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<sup>15</sup> In the language of Hirschman (1970), requesting refunds corresponds to consumer “voice”, and switching amounts to consumer “exit.”

First, the overall refund rates were very high compared to alternative payment platforms: For California, the average refund rate was 14.5 percent in 2011 and 13.0 percent in the first 9 months of 2012 for the PSMS mobile payment industry.<sup>16</sup> These rates are an order of magnitude larger than the chargeback rates for debit and credit card payments. For example, debit card chargeback rates were about 1.5 percent over a one-year period between 2011 and 2012; chargeback rates that were due to unauthorized charges were below 0.1 percent.<sup>17</sup> Refund rates for PSMS were also an order of magnitude above refund rates for app and in-app purchases on mobile marketplaces.

Second, we compared the carriers' refund rates for crammers identified as such through state and federal enforcement actions to those of other providers in the marketplace. The average refund rate for the two groups was very similar.

Third, we examined how the distribution of refund rates varied with the sales revenue of the content provider. In the absence of fraud, this industry would best be modeled as a competitive industry with competition on quality; most monthly prices were fixed at \$9.99, which was often the maximum price allowed by the carriers; the degree of concentration in the market was very low; and entry barriers to produce horoscopes or love-tips were also low. In a competitive industry without fraud (but with a comparatively low price ceiling), the largest providers would have the highest quality and thus the lowest refund rates.<sup>18</sup> However, we did not find such a pattern in the data. Finally, we also had evidence of various changes in the carriers' enforcement policies, and were able to observe the effects of such changes on sales revenue using a regression discontinuity approach.

#### D. Structural Analysis

While the above analysis provided evidence that mobile cramming was a serious problem, it did not provide a quantitative estimate of the amount of unauthorized charges. The methodology developed here suggests one possible way to think about the consumer injury in this case:

To develop such an estimate, we used finite mixture modeling; a growing literature in economics and statistics has examined the non-parametric identification and estimation of mixture models.<sup>19</sup> Finite mixture models are a statistical method to identify subpopulations within an overall population when the data do not identify which observations belong in each subgroup.

In this application, we used the finite mixture model to identify subpopulations (or types) of content providers, and then evaluate whether any of these types of content providers were predominantly responsible for the cramming. The likelihood of the data is:

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<sup>16</sup> See California Public Utilities Commission (2013).

<sup>17</sup> See NACHA (2013). These chargeback rates do not include refunds for product returns.

<sup>18</sup> See Gaynor (2006) for an analysis of competition and quality.

<sup>19</sup> In statistics, see Hall and Zhou (2003), Hall et al. (2005), and Allman et al. (2009). In economics, see Adams (2015), Bonhomme et al. (2014), and Kasahara and Shimotsu (2014).

$$\sum_{j=1}^M \lambda_j \prod_{i=1}^I \prod_{k=1}^R f_{jk}(x_{ik}).$$

There are  $M$  types of content providers in the population; type  $j$  has proportion  $\lambda_j$ . There are  $I$  content providers. There are  $R$  signals, where  $x_{ik}$  is signal  $k$  for content provider  $i$ . The density of signal  $k$  for type  $j$  is  $f_{jk}$ . The signals that we used were refund rates for content providers in different months; we did not assume a parametric form for  $f_{jk}$ , given the lack of symmetry and the fat right tails of the refund rate distributions. The main assumption required for non-parametric identification is that the signals are independent conditional on type.<sup>20</sup>

We applied the statistical algorithms of Benaglia et al. (2009a) and Levine et al. (2011) to estimate the non-parametric finite mixture model; both are implemented in R package mixtools (Benaglia et al., 2009b). The main algorithm that we used estimates the mixture model through an EM-like approach. We estimated the model with the assumption of three different types of content providers. With three types, there were clear differences in refund rates, sales, and identified crammers across the types. Allowing for more types led to similar conclusions but made interpretation more difficult, while allowing for only two types made the providers less similar within each type.

The estimated mixture model sorted the content providers in a very useful way, with content providers that had consistently high refund rates grouped within a single type. Content providers of this type also accounted for a majority of the identified crammers. The content providers in the second type mostly had very low refund rates. The content providers in the third type exhibited variable refund rates over time, and an average refund rate between the first and second types. Estimates of the shares of PSMS sales accounted for by each of these types of content providers informed the BE staff's assessment of the consumer harm in these cases. These results were robust across model specifications.

Relative to a less structural approach, the mixture model can provide three major benefits for economic analysis: First, the mixture model takes into account the degree of persistence in high refund rates – unlike, for example, labeling a content provider as a likely crammer based upon a cutoff on the average refund rate. Second, so long as the structural assumptions hold, it provides a data-driven method to separate the content providers into different types, rather than setting an ad hoc cutoff on refund rates. Third, it provides an easy way to include other sources of information (such as content provider size, or suspensions by other carriers) in the analysis. This additional information would be added to the mixture model as additional signals, provided that they were independent of the other signals conditional on type.

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<sup>20</sup> This assumption rules out autocorrelation in refund rates conditional on type. There was some autocorrelation in refund rates, but inspection of the autocorrelation matrix and auto-regressive regressions revealed that the degree of autocorrelation was fairly low and was limited to the first lag.



## E. Discussion

Both the T-Mobile and AT&T cases concluded with a joint settlement with the FTC, the Federal Communications Commission (FCC), and state Attorneys General. Each carrier was required to pay at least \$90 million in refunds to consumers as well as civil penalties to the FCC and states. In addition, the settlements placed the carriers under order to send purchase notifications separate from the phone bill for third-party charges, to obtain express informed consent before placing third-party charges on mobile phone bills, and to inform consumers about options to block all third-party charges. The Consumer Financial Protection Bureau (CFPB) subsequently sued Sprint and Verizon on charges of mobile cramming as well, and obtained similar settlements as in the FTC cases.<sup>21</sup>

While the PSMS text message market was voluntarily discontinued by all four major carriers in late 2013, third-party payments, such as in-app purchases, can be charged to mobile phone bills through Direct Carrier Billing. This market is projected to be \$11 billion worldwide by 2016 for app store purchases alone.<sup>22</sup> Thus, the analysis in this case may be relevant in the future for this growing market.

## III. Susceptibility to Fraud Study

The FTC is charged with protecting consumers from deceptive or unfair acts and practices. The agency fulfills this mission through law enforcement actions, consumer and business education, and policy efforts, including conducting original research to inform FTC actions. The FTC has conducted nationally representative surveys to determine the proportion of the U.S. adult population that has fallen victim to various consumer frauds. In 2011, an estimated 10.8 percent of U.S. adults – approximately 25.6 million consumers – were victims of one or more of the frauds that were covered by the survey (Anderson, 2013). Yet, there is little research to help policymakers understand the determinants of fraud victimization.

This section describes a BE study (McAlvanah et al., 2015) that was designed as a preliminary and exploratory step toward a greater understanding of the determinants of susceptibility to fraud. Economic and psychological experiments have identified several decision-making biases that can cause systematically inaccurate assessments of the risks, costs, and benefits of various choices. In addition, other factors, such as consumer literacy or skepticism of advertising, may also contribute to consumers' assessments of an ad's credibility. In this study, we employed experimental economics techniques to gain insight into the factors that affect consumer susceptibility to fraudulent advertising.

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<sup>21</sup> See *CFPB v. Sprint Corp.*, 14 CV 9331 (S.D. NY Dec. 1, 2014) and *CFPB v. Verizon Wireless*, 15 CV 3268 (D. NJ May 12, 2015).

<sup>22</sup> See FTC (2014b).

## A. Study Design

In an experimental setting, it is not plausible to identify participants who actually would fall victim to fraudulent offers. We therefore focused on what may be the first step in fraud victimization: whether an individual finds implausible, “too good to be true” advertisements as credible. Consumers who do not view implausible ads as credible are probably unlikely to purchase the advertised product and thereby fall victim to fraud. On the other hand, at least some of those who find implausible ads to be highly credible are more likely to purchase the product. We asked participants to rate the credibility of a series of mock-ups of plausible and implausible print advertisements that we designed. We then measured a variety of economic, psychological, and demographic variables and examined their relationship with consumers’ assessments of the credibility of these plausible and implausible advertisements.

One advantage of our experimental design is that each subject viewed both plausible and implausible advertisements. This design enables us to examine whether subjects who are disbelieving of implausible ads are naturally more skeptical of all advertisements, or are skeptical solely of implausible advertisements. Further, previous work on individual characteristics and fraud susceptibility has been based upon retrospective self-reports. One limitation of retrospective surveys is that fraud victims may distort their memories about why they fell for a particular fraud in order to justify their actions. Alternatively, fraud victimization might alter an individual’s beliefs or attitudes. Our experiment collected subjects’ reactions in “real time,” enabling us to measure the relationship between individuals’ current characteristics and fraud susceptibility.

BE staff designed the experiment instrument and contracted with economists at George Mason University to recruit subjects to participate in the experiment. As this was an exploratory study to determine feasibility, we relied on a “convenience sample”: a sample that is easy to assemble, rather than one that has been carefully tailored to be representative of a larger group (e.g., the U.S. national adult population). Thus, the participants in the experiment were drawn from a subject pool that consisted of several thousand individuals who voluntarily participate in experiments for monetary compensation in the form of show-up fees and experimental earnings. The subject pool predominantly consists of current George Mason University students, along with a small percentage of alumni and non-university affiliated individuals, and is therefore not representative of the U.S. population. Nonetheless, it allowed us to get a total of 254 subjects to participate in the study.

We designed four advertisements with implausible, “too good to be true” claims as found in some fraudulent advertisements: an excessively lucrative work-from-home job; a memory-boosting drink; a “free” vacation offer that required pre-payment of only government taxes; and a pill that was guaranteed to result in weight loss. Several of these implausible claims were ones that the FTC previously has warned consumers against. For example, the ad for the weight-loss pill claimed that consumers would

“lose up to 10 pounds per week” and that the product was “guaranteed to deliver permanent weight loss for everyone.”

For each of the four implausible advertisements, we also created a version of the ad that contained solely plausible claims. For example, the plausible version of the weight loss ad did not promise guaranteed weight loss but simply advertised foods that “help you feel fuller longer;” the plausible version of the vacation ad eliminated the “free” claim and instead stated a plausible room rate. The matching of a plausible and an implausible ad for the same type of product enabled us to examine whether subjects were skeptical of *any* weight loss ad, or skeptical solely of weight loss ads that promise guaranteed and significant weight loss.

Finally, we also designed four advertisements that represented typical advertisements for products not typically associated with fraudulent claims: a fleece blanket; a wireless mouse; an MP3 player; and pizza delivery. There were no matched implausible versions of these ads. We refer to these four ads as “control ads”, which serve to measure subjects’ baseline credibility judgments of advertising in general.

Each subject rated the credibility of eight different advertisements from among the 12 ads that we developed: all subjects rated the four control ads, two ads with implausible claims, and two ads for potentially fraudulent products but with plausible claims. For each of the potentially fraudulent product categories, a given subject saw either the plausible or implausible version, but not both. The particular combination of plausible versus implausible ads was randomized among subjects.

## B. Results

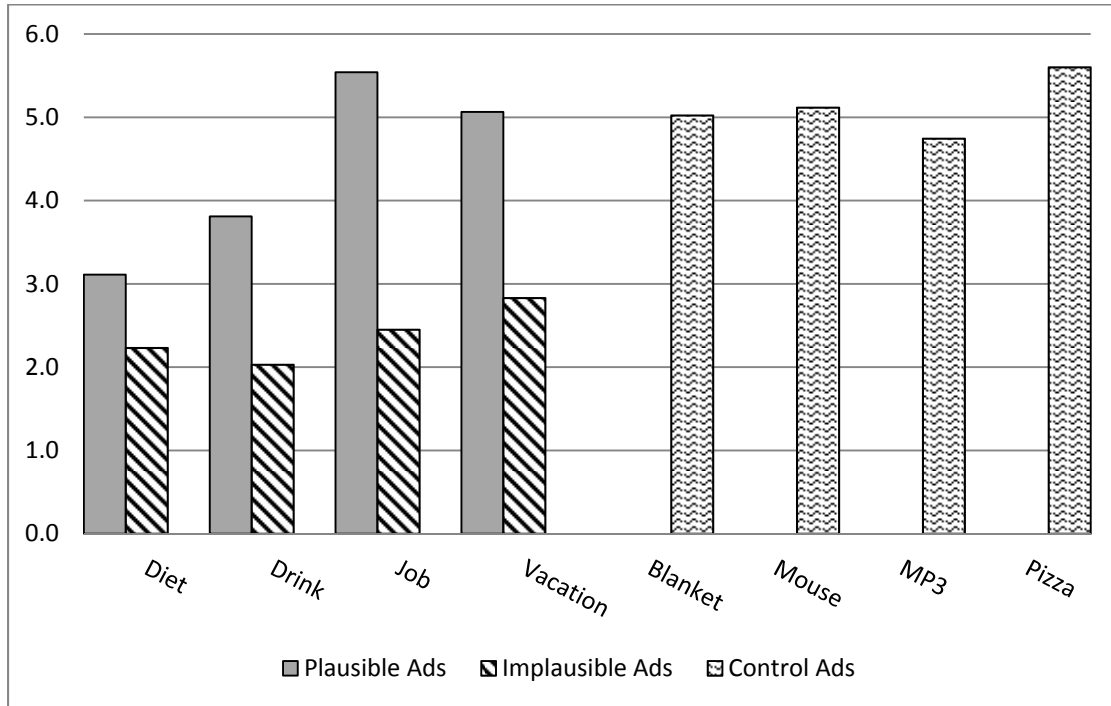
Figure 1 presents the mean credibility ratings for each of the ads that were used in the study. Subjects rated the ads’ credibility on a scale of one to seven, with higher ratings’ indicating greater credibility.

The results indicate that our ad manipulations worked as intended. On average, participants rated the four control ads with relatively high credibility scores. Interestingly, however, there was significant variation in the ratings for the ads in the plausible ad category. Participants judged the plausible versions of the job offer and the vacation ads to be as credible as the control ads. However, participants rated the plausible versions of the diet and the memory-boosting drink ad as less credible than the control ads.

One possible explanation for this difference is that our ad manipulations for the diet and drink ads were simply not as plausible as for the job and vacation ads. Another possible explanation is that previous frauds that have involved diet and supplement products have caused consumers to be particularly wary of any ad claims in these product categories, even if the claims are plausible.

Finally, the vast majority of our participants expressed skepticism towards the implausible ads. On average, participants rated each of the implausible ads as less credible than the plausible ad versions for the same products and much less credible than the control ads.

Figure 1: Average Ad Credibility Ratings, by Product and Ad Type



We next examine whether individuals' characteristics can predict why some individuals rated implausible offers as incredible whereas other individuals rate the same implausible ads as credible. We measured a variety of individual characteristics and analyzed their relationship with subjects' credibility ratings of both plausible and implausible advertisements. Specifically, we measured subjects' optimism, consumer literacy, impulsivity, numeracy, confirmation bias, overconfidence, risk tolerance, loss aversion, present-bias, impatience, skepticism of advertising, and demographic information.<sup>23</sup>

We consider three research questions: (1) What characteristics are associated with subjects' credibility assessments of plausible advertisements? (2) What characteristics are associated with subjects' credibility assessments of implausible advertisements? And what are the associations when focusing only on subjects who rated the implausible advertisements as particularly credible, the group of individuals who are presumably the most likely to be actual fraud victims? and (3) How correlated are subjects' ratings of plausible and implausible ads?

<sup>23</sup> For a detailed description of these characteristics and a discussion of how they were measured for this study, see McAlvanah et al. (2015).

For the plausible ads, we found that people with greater numeracy and people who are relatively overconfident rated these ads as more credible than did the individuals without these characteristics. We also found that people who are relatively impulsive, as well as people who are relatively more skeptical of advertising, rated the plausible ads as less credible.

For the implausible ads, we found that individuals with greater consumer literacy and skepticism towards advertising rated these ads as less credible, and overconfident individuals rated the implausible ads as more credible. We also found unexpected relationships of numeracy and impulsivity on the credibility ratings of the implausible ads; individuals with greater numeracy were more likely to rate implausible advertisements as credible, and more impulsive individuals were less likely to rate implausible ads as credible. We expected these associations to be in the opposite directions, and we do not have a clear explanation for the contrary results that we found.

Since individuals who find the implausible ads the most credible may be especially likely to be swayed by such advertising, we examined the ability of individual characteristics to predict whether an individual rated an implausible ad as being more credible than not (by selecting a rating higher than neutral on a scale that went from extremely incredible to extremely credible). We found that all of the variables that were associated with individuals' ratings of implausible ads remained significant, with the exception of consumer literacy. Though consumer literacy is negatively associated with individuals' credibility ratings of implausible advertisements in the overall sample, it is not significantly predictive of rating implausible ads as highly credible.

We also examined whether individuals who assigned low credibility ratings to the plausible ads also assigned low credibility ratings to the implausible ads, which may suggest that these consumers are simply less trusting of any advertisement. To the contrary, we found that an individual's rating of plausible ads was not predictive of his rating of implausible ads, which suggests that assessments of plausible and implausible ads are separate processes.

### C. Limitations and Discussion

There are several important limitations to this study. The first limitation, inherent to many experiments, is the artificiality of our environment. Subjects viewed print advertisements in the absence of any other contextual or environmental cues. In the real world, multiple factors contribute to a consumer's reaction to an advertisement. There may be other signals that an ad is fraudulent in addition to the content of the claims, and our study is necessarily silent on these factors.

Another limitation is that our subject pool was a convenience sample drawn from a university population and was not nationally representative. Yet another limitation is that we measured subjects' assessments of ad credibility and not willingness to pay or actual purchase decisions. Our experiment thus

measures one of the initial stages along the path towards fraud victimization, with no guarantee that our results hold for actual victimization outcomes.

Even with these limitations, our study makes some significant contributions to the understanding of fraud victimization and other consumer protection issues. The experimental techniques and methodology used in this study could also be applied to different samples or different settings to inform and improve consumer protection policy. Also, our advertising manipulations were extremely effective: Subjects rated the implausible versions of our advertisements as significantly less credible than the matched plausible versions. Moreover, there was significant variation in subjects' credibility assessments of the different advertisements. Though most subjects rated the implausible advertisements as unbelievable, a small portion of subjects did view the implausible claims as believable.

Finally, relatively high credibility ratings for implausible ads were associated with measurable individual characteristics. As expected, we found that consumer literacy and skepticism are associated with lower credibility ratings for implausible ads, and overconfidence is associated with higher ratings. Surprisingly, we found counter-intuitive associations between credibility ratings for implausible ads and two measures: impulsivity (negatively correlated) and numeracy (positively correlated). As such, further exploration of economic and psychological variables may be fruitful avenues for future research on fraud victimization.

#### IV. Verisk Analytics, Inc./EagleView Technology Corp

The proposed acquisition of EagleView Technology Corp (EagleView) by Verisk Analytics, Inc. (Verisk) involved vertical issues, since it would merge two dominant suppliers of complementary inputs. However, it also raised horizontal concerns because Verisk was in the process of entering EagleView's market and had begun to serve customers.<sup>24</sup> Thus, the merger was fundamentally a two-to-one horizontal merger that also exhibited some interesting vertical issues. The horizontal overlap occurred in the provision of roof dimensions to insurance carriers using aerial images of roofs. The parties abandoned the merger the day after the Commission issued a complaint.

##### A. Industry Background

The products under investigation were "rooftop aerial measurement products" (RAMP). These products provide a building's roof dimensions based on aerial images of the roof. These products require three basic inputs: orthogonal and oblique aerial roof images; human labor (with some computer assistance) to trace an outline of all of a roof's facets from the images; and software that converts the

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<sup>24</sup> See *In the Matter of Verisk Analytics, Inc.*, Docket No. 9363 (Dec. 16, 2014) (henceforth Complaint) at ¶ 3 available at <https://www.ftc.gov/system/files/documents/cases/141216veriskcmpt.pdf>.

roof's outline into the roof's dimensions. The "full-service" versions of these products return a roof report with the needed roof dimensions to a customer who simply provides a property's address. The do-it-yourself version provides the customer with the aerial images and access to the software that is needed to outline the roof and to calculate the dimensions from that outline. Insurance carriers who must settle claims for roof damage are a significant segment of customers for these products and the customers most likely to be harmed by the merger.<sup>25</sup>

EagleView pioneered the software that calculates dimensions from roof outlines in 2006, and claims patents on this software.<sup>26</sup> EagleView's initial business model included purchasing the rights to use aerial images from Pictometry International: the leading seller of high-resolution aerial images, with a library that covered over 90% of the structures in the United States.<sup>27</sup> At that time, Verisk, through its Xactware subsidiary, sold Xactimate, which was the dominant claims estimation software and system for managing and administering claims. It would convert a property's roof dimensions (along with other administrative information such as location) into the cost of the roof repair<sup>28</sup> and produce the needed paperwork to process the claim.

In 2008, EagleView and Xactware reached an agreement that enabled EagleView reports to be integrated electronically into Xactimate. This meant that EagleView-generated roof dimensions could be imported electronically into Xactimate, which eliminated the need for carriers to enter these data manually, thereby saving time and reducing errors. EagleView agreed not to be integrated electronically nor to enter into any agreement with Xactware's direct competitors, who were delineated in the agreement.<sup>29</sup> Since Xactimate was the dominant claims estimation software, this relationship helped make EagleView the dominant supplier of RAMP to the insurance industry.

Over the next several years, both parties seemingly violated the spirit if not the letter of the exclusivity agreement. Verisk began to offer RAMP products including both a do-it-yourself version called Aerial Sketch, and a full service version called Roof InSight. It also made substantial progress in amassing its own high-resolution image library.<sup>30</sup> EagleView enabled other cost estimation software to access its roof reports electronically.

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<sup>25</sup> Contractors who prepare bids for projects that are unrelated to insurance claims are the other large class of customers using these products.

<sup>26</sup> See EagleView; About Us. <http://www.eagleview.com/AboutUs.aspx>.

<sup>27</sup> See Complaint at ¶ 40.

<sup>28</sup> Xactimate was based on a very large database that contained detailed and constantly updated cost information on all construction-related costs in very localized areas across the entire country. Xactimate provided estimates for other building repairs as well, but these services were not implicated in the merger.

<sup>29</sup> See Eagle View Technologies, Inc., Plaintiff, v. Xactware Solutions, Inc., Defendant. Complaint for Declaratory and Injunctive Relief, Exhibit A at 3.

<sup>30</sup> See Complaint at ¶40. The only other usable image library for this purpose had less coverage, and typically had lower resolution than Pictometry's library, which made estimates less accurate. Verisk documents indicated that Verisk had plans to complete its library. See Complaint at ¶ 40. Indeed when the merger was abandoned, Verisk

In October of 2012, EagleView initiated a private suit against Verisk, and Verisk countersued. Shortly thereafter EagleView bought Pictometry to control the image library upon which the vast majority of RAMP products were based. Verisk then proposed the merger as a way to settle the private suits.

When the merger was announced, EagleView accounted for about 90% of RAMP sold for insurance purposes<sup>31</sup> and served 24 of the 25 largest insurance carriers.<sup>32</sup> Verisk's Aerial Sketch and Roof InSight accounted for essentially the rest.<sup>33</sup> Thus, the merger would have brought 99% of the RAMP for insurance purposes<sup>34</sup> and the two best aerial image libraries under Verisk's ownership.

85% of all insurance carriers used Xactimate to process their claims,<sup>35</sup> which made Verisk the dominant supplier of cost estimation software. Two firms served the balance of carriers for cost estimation software. Only Symbility had a competitively significant share in roof repair cost estimation.<sup>36</sup>

## B. Theory of Harm

At the time of the merger, Verisk had been selling Aerial Sketch for just over a year and had just begun to offer Roof InSight. Aerial Sketch had captured one large carrier (and several small ones) from EagleView. Two large insurance carriers (and some small ones) had switched significant business to Roof InSight. Carriers that switched from EagleView enjoyed significantly lower prices.<sup>37</sup>

The primary harms from the merger included the likely loss of benefits that customers who had switched to Roof InSight enjoyed, and the elimination of the price competition that very likely would have lowered prices to all customers.<sup>38</sup>

Because of the short period over which competition occurred, analysis of the likely harm had to be based on anecdotal evidence and documents rather than estimation techniques that could be based on observed substitution patterns. Estimation of the likely price effects was based upon the price reductions that were received by the two large customers that switched significant amounts of business from EagleView to Roof InSight,<sup>39</sup> and upon internal company documents that indicated that executives expected that Roof InSight would be sold at a discount relative to EagleView.<sup>40</sup>

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announced it would continue to capture images. THOMSON REUTERS STREETEVENTS EDITED TRANSCRIPT VRSK - Q4 2014 Verisk Analytics Earnings Call Event Date/Time: February 25, 2015 / 1:30PM at 9.

<sup>31</sup> See Complaint at ¶ 3.

<sup>32</sup> See Complaint at ¶ 18.

<sup>33</sup> See Complaint at ¶ 3.

<sup>34</sup> See Complaint ¶ 29.

<sup>35</sup> See Complaint at ¶ 20.

<sup>36</sup> See Complaint at ¶ 21.

<sup>37</sup> See Complaint ¶ 38 and 39.

<sup>38</sup> For example, Verisk suspended ongoing negotiations with a number of prospective customers until the merger outcome was resolved. (Complaint ¶36)

<sup>39</sup> See Complaint ¶39. Note that if these customers could not be served for a particular property by Roof InSight, they could go back to EagleView for a dimension estimate.

<sup>40</sup> See Complaint ¶ 39.



A second source of harm involved EagleView's claimed patents. EagleView had used patent infringement suits to cause several smaller RAMP entrants to exit the market.<sup>41</sup> A small entrant without a competitive advantage would not likely find fighting such patent claims profitable. Verisk, on the other hand, had both the financial wherewithal and greater incentives to litigate the patents' validity.<sup>42</sup> It had the prospect of winning a large portion of the RAMP market by offering its own RAMP based on its own image library. Thus, blocking the merger would preserve the only competitor who likely had sufficient incentive to litigate the validity of the EagleView patents.

### C. Market Definition

The relevant market was RAMP for insurance purposes. While contractors not involved with insurance work also use these products, insurance carriers (and associated independent adjusters) have requirements that contractors do not. These include: (i) the ability to supply a roof report very quickly (in many instances in just several hours); (ii) the ability to provide thousands of roof reports in a day in case of a wide-scale catastrophe; (iii) electronic integration into claims estimation software; (iv) an accuracy level admissible in court; and (v) for national carriers with a single company-wide processing protocol, a supplier with access to an image library that covered the entire country. Given suppliers' ability to price discriminate between contractors and insurance carriers, RAMP for insurance purposes could be identified as a separate product market.

The most interesting aspect of market definition was how to treat manual roof measurement (i.e. climbing on the roof and using a tape measure). This was the only alternative to RAMP and was typically used for simple roofs (and roofs for which no usable image was available). Including manual measurement would not alter the competitive effects analysis, but would lower the HHI and possibly suggest that the market was more competitive than it actually was.<sup>43</sup>

The complaint excluded manual measurement from the market.<sup>44</sup> This was appropriate because manual measurement could not mitigate the harm from the merger. Specifically, the cost of manual roof measurement is the cost of sending people onto roofs with tape measures, which changed very little in the years prior to the merger and was unlikely to change post-merger. Thus, whatever competitive pressure manual measurement imposed on RAMP was likely stable. Verisk's introduction of Roof InSight lowered prices to some customers and would likely have lowered prices to others as competition increased. If the merger were consummated, then those customers that had received lower prices from Verisk would likely

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<sup>41</sup> See Complaint ¶ 44.

<sup>42</sup> See Complaint ¶ 35.

<sup>43</sup> See US Department of Justice and FTC (2010), henceforth Guidelines, at 8.

<sup>44</sup> See Complaint at ¶ 26.

see the prices revert to pre-Roof InSight introduction levels, and there would be no competition to drive prices below those levels for other customers.

Manual roof measurement could not replace the loss of competitive pressure that the merger would cause. It could only prevent prices from rising above their pre-Roof InSight entry levels. Thus, manual measurement was irrelevant when considering the competitive effects of the merger and should be excluded from the relevant antitrust market.

The 2010 Guidelines prescribe a SSNIP analysis that supports this conclusion. It states that the appropriate benchmark price for the SSNIP test is the price that would prevail but for the merger.<sup>45</sup> Although a few contracts had been signed following the entry of Verisk's Roof InSight, the vast majority of prices that prevailed at the time of the merger were the result of contracts signed before Roof InSight's entry. The Complaint maintained that the RAMP prices but for the merger would be lower than the pre-entry price.<sup>46</sup> Thus, the appropriate benchmark price for carrying out the SSNIP test was this lower price.<sup>47</sup>

Intuitively, when EagleView had been essentially a RAMP monopolist (prior to Verisk's entry), it could have set the RAMP price at this benchmark level. However, it decided against such a course, indicating that the pre-entry price was more profitable than the benchmark price. This revealed preference analysis implies that a SSNIP that increases the price from the benchmark price to the pre-entry price must be profitable, indicating that there is a relevant antitrust market that includes RAMP but excludes manual measurement.<sup>48</sup>

#### D. Vertical Efficiencies

Since Verisk and EagleView owned the dominant RAMP and claims estimation software respectively, and RAMP and claims estimation software are complementary inputs, the merger could result in efficiencies that benefit customers because it brought complementary inputs under common ownership. Such efficiencies were likely to be minimal at best, for two reasons:

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<sup>45</sup> See Guidelines at 10. A SSNIP test asks whether a hypothetical monopolist controlling all products in the proposed relevant market would find it profitable to impose a "small but significant non-transitory increase in prices", or SSNIP. If so, the Guidelines suggest that the set of products constitutes a relevant antitrust product market for the purposes of merger analysis.

<sup>46</sup> See Complaint at ¶ 1.

<sup>47</sup> This estimated lower price could be based on the lower prices that were received by the two carriers that switched to Roof InSight. In most mergers where the theory of harm is that prices will increase from their pre-merger levels and would remain at their pre-merger levels but for the merger, the appropriate benchmark is the pre-merger price. In this case, because the theory is that price would decrease but for the merger, the appropriate benchmark is that lower price.

<sup>48</sup> To formalize this intuition, the Commission could show that the appropriate benchmark price would be at least 5% below the pre-entry price. Then there would be one SSNIP of greater than 5% that was profitable. To show that a 5% increase would be profitable (as is customary in the Guidelines), one could appeal to a mild assumption of monotonicity of profit with respect to price over this price range.

First, since Verisk was in the process of completing its own image library (at a quality level higher than EagleView's), in the absence of the merger, there would be integration by ownership between Roof InSight and a high resolution RAMP with national coverage. There would be very little marginal benefit from co-ownership between Roof InSight and a second high resolution RAMP with national coverage, especially if Verisk were to cease maintaining one of the two libraries, which Verisk surely would have done.<sup>49</sup>

Second, there was already electronic integration between EagleView and Verisk's Xactimate. In fact, the exclusivity agreement between the two companies occurred as part of the arrangement to develop the technical integration. Thus, there appeared to be no need for Verisk to own EagleView to have an incentive to create some technical interface between EagleView and Xactimate as this already existed.

#### E. Other Vertical Concerns

Although not part of the complaint, this merger could have resulted in competitive harm in the market for cost-estimation software as well. As noted above, Symbility was the only competitor of Xactimate of any significance. Large carriers who use RAMP prefer to have the results electronically integrated with claims-estimation software. The merger would bring the only two high-resolution U.S. image libraries under the control of Verisk. Verisk would have a strong incentive to prevent its RAMP from being used with its competitors' cost estimation software. This would put competing claims-estimation software at a considerable disadvantage, as they would not be able to have their customers use the most accurate images, which means they would not have the most accurate cost estimates. Estimation-software competitors would become less attractive alternatives. Thus, this merger could have reduced competition in the claims-estimation software market as well.

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<sup>49</sup> Even if Verisk were going to abandon its image library, there would be little benefit in this market from combining the production complements. Primarily this is because the number of claims that are processed effectively is exogenously determined by the number of roofs damaged by weather and fire, and therefore independent of the price of processing claims. For each claim, a carrier must decide whether to use RAMP or measure manually, and decide whether to use Xactimate or some other cost-estimation process. Carriers make these decisions independently of each other.

As a result, merging the ownership of the monopoly RAMP and the dominant cost estimation software creates no incentive for the new owner to lower the individual price of either input. For example, if the owner were to lower the price of cost estimation software, some customers might switch from, say, in-house cost calculation to cost estimation software. However, this would not cause any of them to switch to RAMP. And since the number of claims is determined by exogenously determined roof damage, no additional claims would be filed to create new opportunities for customers to buy additional RAMP. Thus, the merger creates no additional incentive to lower the price of cost-estimation software. Similar analysis implies that there would be no incentive to lower the price of RAMP individually.

Such a merger could create an incentive for the merged firm to use mixed bundling to sell RAMP and cost-estimation software. However, there is no reason to believe mixed bundling would make customers better off than individual goods pricing, and it is easy to write down examples in which consumers as a whole are worse off under mixed bundling than under individual goods pricing.

## V. North Carolina Board of Dental Examiners

The Staff of the FTC is often asked to comment on proposed state laws or regulations that may impact competition in various marketplaces.<sup>50</sup> A type of regulation that has historically been of interest to FTC Staff, and has continued to be a focus of our competition advocacy efforts in recent years, concerns restrictions on the set of providers who are allowed to perform particular services. These regulations can impact markets for human healthcare, animal healthcare, real estate, and dental services, to name a few. Typically, our role in these discussions is to offer a comment to state legislative bodies that are considering such regulations; the comment typically is focused on the competitive impact. However, this section discusses a legal action that was undertaken by the FTC with respect to an attempt to restrict the set of providers who would be allowed to provide teeth whitening services in North Carolina.

### A. Background

Human teeth can be whitened by applying a solution containing peroxide. This can be done at a dentist's office, at home with a do-it-yourself kit, or at a kiosk in a mall or a spa. The personnel staffing the latter facilities typically have no dental health training; they merely assist the customer in the use of a kit.

On June 17, 2010, the FTC filed an Administrative Complaint against the North Carolina Board of Dental Examiners (the "Board"), alleging that it had violated Section 5 of the FTC Act by issuing letters to non-dentist providers of teeth-whitening services. The letters claimed that non-dental teeth whitening constitutes the unlicensed practice of dentistry under the North Carolina Dental Practice Act [N.C. Gen. Stat. § 90-22, 1981], and ordered the non-dentist competitors to Cease and Desist from providing those services.<sup>51</sup> The Board has no legal authority to issue such orders; it is only permitted to send letters that express the opinion that non-dental teeth whitening is illegal and state an intention to initiate legal action.<sup>52</sup> FTC Complaint Counsel maintained that these letters were intended to be understood as self-enforcing Orders, and were in fact understood that way by many recipients, who exited the industry in response; and that this exclusion constituted an antitrust violation.<sup>53</sup>

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<sup>50</sup> An archive of the FTC's comments on these and other proposed state laws and regulations is available at <https://www.ftc.gov/policy/advocacy/advocacy-filings>.

<sup>51</sup> See Administrative Complaint, *In re North Carolina Board of Dental Examiners*, No. 9343 (June 17, 2010) at 1, available at <https://www.ftc.gov/sites/default/files/documents/cases/2010/06/100617dentalexamcmpt.pdf>.

<sup>52</sup> See Opinion of the Fourth Circuit Court of Appeals Denying Petitioner's Petition for Review (May 31, 2013) at 5, available at <https://www.ftc.gov/system/files/documents/cases/130531ncbdopinion.pdf>.

<sup>53</sup> See Administrative Complaint (June 17, 2010) at 4, available at <https://www.ftc.gov/sites/default/files/documents/cases/2010/06/100617dentalexamcmpt.pdf>.

The Board also sent letters to the owners of malls and spas. These letters encouraged the owners not to allow non-dental teeth whitening on their premises. Complaint Counsel claimed that this was also a violation of Section 5.<sup>54</sup>

At issue in this case were two distinct questions, and for this reason the legal proceedings moved along two separate tracks. One track, which led to the U.S. Supreme Court, dealt with the question of whether the actions of the Board, by virtue of its status as an entity established under state law, were to be considered the actions of the sovereign state of North Carolina, and thus exempt from federal antitrust scrutiny. On February 25, 2015, the Supreme Court ruled in favor of the FTC, finding that the Board was not sufficiently subjected to active supervision by the State to satisfy the legal conditions for a state action exemption.<sup>55</sup>

The other track (which would have been rendered moot had the Board prevailed in its state action claim) dealt with the question of whether the Board's conduct was permissible under the antitrust laws. This track began with a full trial on the merits before an FTC Administrative Law Judge (ALJ).<sup>56</sup> On July 14, 2011, the ALJ ruled in favor of FTC Complaint Counsel, finding that the exclusion did constitute a violation under Section 5 of the FTC Act.<sup>57</sup> The Board appealed this decision to the FTC, which upheld the ALJ's decision in a unanimous decision on December 7, 2011.<sup>58</sup>

## B. Economic Foundation

We begin our analysis of the likely effects of excluding non-dental teeth whitening by considering the relevant theory and the empirical evidence from the academic research literature. These will inform our priors, which will then be updated based on the case-specific evidence.

### 1. Theoretical Model

The economic logic for how exclusionary conduct harms consumers is straightforward, and can be illustrated with the following simple model setup: Suppose consumers have a choice between a high quality, relatively high cost service, and a lower quality, lower cost service, and that each service is supplied by a large number of identical competing sellers. Also suppose that pre-exclusion, in equilibrium, a strictly positive number of consumers choose to buy each of the services. Exclusionary

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<sup>54</sup> See Complaint Counsel's Pretrial Brief (January 19, 2011) at 7, available at

<https://www.ftc.gov/sites/default/files/documents/cases/2011/01/110119ncbriefcmpt.pdf>.

<sup>55</sup> See Syllabus, *North Carolina State Board of Dental Examiners v. Federal Trade Commission*, No. 13-534 (Feb. 25, 2015), available at <https://www.ftc.gov/system/files/documents/cases/150225ncdentalopinion.pdf>.

<sup>56</sup> Dr. John Kwoka testified at trial as an economic expert on behalf of the FTC, and Dr. David Baumer testified as an economic expert on behalf of the Board.

<sup>57</sup> See Initial Decision, *In re North Carolina Board of Dental Examiners*, No. 9343, at 8, available at <https://www.ftc.gov/sites/default/files/documents/cases/2011/07/110719ncb-decision.pdf>.

<sup>58</sup> See Opinion of the Commission, *In re North Carolina Board of Dental Examiners*, No. 9343, available at <https://www.ftc.gov/sites/default/files/documents/cases/2011/12/111207ncdentalopinion.pdf>.

conduct by sellers of the high-quality service consists of some action that raises the cost, and hence the price, of the low-quality service.

To illustrate the effects of exclusion in this setup, we adapt the vertical differentiation framework of Balan & Deltas (2013, 2014). Instead of a high quality dominant firm competing against a low quality competitive fringe as in those models, here we assume a large number of identical competing firms selling dental teeth whitening and a large number of identical competing firms selling non-dental teeth whitening. The dental whitening firms employ dentist labor and expensive dental practice equipment, and the non-dental whitening firms employ much cheaper non-dentist labor and much less expensive equipment.<sup>59</sup>

A mass of consumers differ in their marginal willingness-to-pay for quality. The indirect utility of consumer  $i$  for product  $j$  is given by:  $U_{ij} = \theta_i x_j - P_j$ , where  $\theta_i$  is the marginal willingness of consumer  $i$  to pay for a unit increase in quality;  $x_j$  is the quality of product  $j$ ; and  $P_j$  is the price of product  $j$ , where  $j \in \{D, ND\}$ ,  $D$  denotes dental whitening, and  $ND$  denotes non-dental whitening. We assume that  $x_D > x_{ND}$ , which means that the model grants the questionable proposition that all consumers regard teeth whitening services by dentists to be of higher quality than services by non-dentists. If many identical dental firms and many identical non-dental firms provide these services, then presumably  $P_j = c_j \forall j$ , where  $c_j$  is the marginal cost of product  $j$ . In order for anyone to buy the lower quality service in equilibrium, it must be that  $P_D > P_{ND}$ .

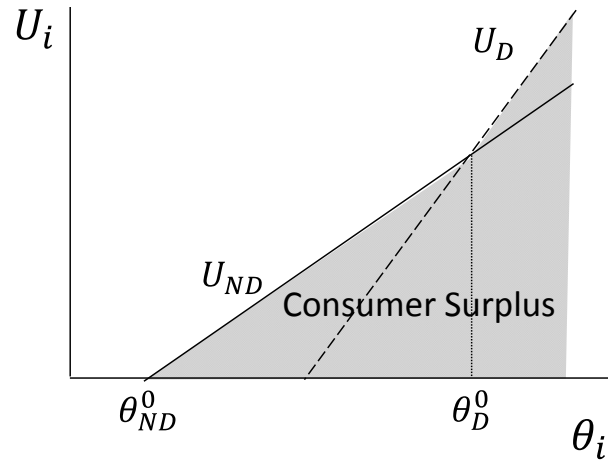
Pre-exclusion (indicated by a 0 superscript), there is a critical value  $\theta_D^0$  such that, given prices, a consumer characterized by  $\theta_i = \theta_D^0$  is indifferent between purchasing dental or non-dental whitening. There is another, lower critical value  $\theta_{ND}^0$  such that a consumer characterized by  $\theta_i = \theta_{ND}^0$  is indifferent between purchasing dental whitening and not purchasing teeth whitening services at all, the utility from which is normalized to zero.<sup>60</sup> We assume that a strictly positive measure of consumers chooses each option. This setup is depicted in Figure 2.

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<sup>59</sup> Many dentists own their own practices, and relatively few are directly employed by firms. So, in many instances the dental firm and the dentist are one and the same. But it is conceptually possible to distinguish between these two functions, and doing so will prove useful below.

<sup>60</sup> As mentioned above, consumers also have the option of purchasing do-it-yourself teeth whitening kits. Since these kits were not the target of exclusionary conduct, and were available both pre- and post-exclusion, we treat consumers who purchase these kits as “not purchasing teeth whitening services.” However, the presence of these kits as an alternative likely mitigated the effects of the exclusion.

Figure 2: Pre-Exclusion Surplus (Holding Prices Constant)



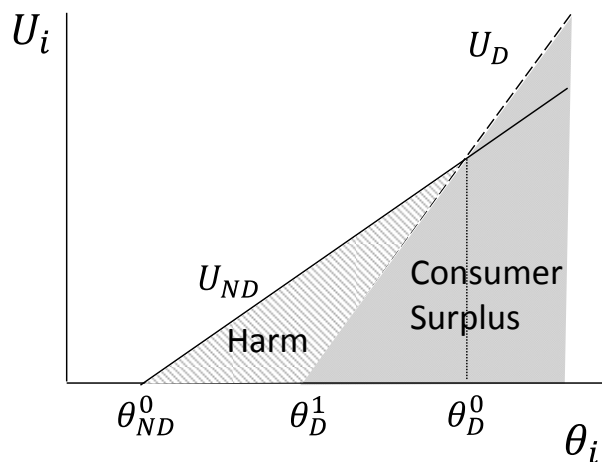
The dashed line  $U_D$  represents the consumer surplus from dental whitening, and the solid line  $U_{ND}$  represents the consumer surplus from non-dental whitening. Both lines are increasing in  $\theta_i$ ; holding prices constant, placing a higher value on quality means receiving higher utility from consuming the product, and hence higher consumer surplus.  $U_D$  is steeper than  $U_{ND}$ , because (again holding prices constant) placing a higher value on quality increases utility by more when the service is a high-quality one. The  $y$ -intercept for  $U_D$  is lower than for  $U_{ND}$  because the high-quality product has a higher price, which means that a hypothetical consumer for whom  $\theta_i = 0$  would be worse off buying dental whitening than non-dental whitening. This, combined with the assumption that each service is chosen by a positive measure of consumers in equilibrium, guarantees that the two lines will cross somewhere within the support of  $\theta_i$ . Total consumer surplus is the shaded area below the upper envelope of the two lines in Figure 2.<sup>61</sup>

Now suppose that the exclusionary conduct increases  $c_{ND}$  by enough to completely drive non-dentists out of the teeth-whitening market.<sup>62</sup> Consumers then can only get teeth whitening services from dentists. Also suppose that the exclusion does not drive up the price of dental whitening services (i.e., the supply curve for dental whitening services is perfectly elastic); the implications of relaxing this assumption will be discussed below. Figure 3 depicts the post-exclusion consumer surplus and also the consumer harm from the exclusion.

<sup>61</sup> Figure 2 depicts total consumer surplus under the assumption that  $\theta_i$  is uniformly distributed, but this is not central to the analysis.

<sup>62</sup> This is for simplicity; the effects of only partially effective exclusion are qualitatively similar.

Figure 3: Post-Exclusion Surplus (Holding Prices Constant)



The thresholds  $\theta_D^0$  and  $\theta_{ND}^0$  are reproduced from Figure 2 above. Consumers characterized by  $\theta_i < \theta_{ND}^0$  and by  $\theta_i > \theta_D^0$  are unaffected by the exclusion; their pre-exclusion choices are still available to them, at the same prices, post exclusion. Consumers characterized by  $\theta_i \in [\theta_{ND}^0, \theta_D^0]$  can no longer obtain their pre-exclusion choices (non-dental whitening), and must either switch to dental whitening or not buy at all. The threshold  $\theta_D^1$  represents the value of  $\theta_i$  characterizing a consumer who, post-exclusion (indicated by a 1 superscript), is indifferent between these two choices.<sup>63</sup> Consumers characterized by  $\theta_i \in [\theta_{ND}^0, \theta_D^1]$  place a low enough value on quality that they no longer buy teeth whitening services at all. These consumers lose all of their consumer surplus. Consumers characterized by  $\theta_i \in [\theta_D^1, \theta_D^0]$  place a high enough value on quality that they switch to dental whitening, increasing its demand. These consumers experience harm equal to the difference between the surplus that they received from low-price, low-quality non-dental whitening pre-exclusion, and the (lower) surplus that they receive from high-price, high-quality dental whitening post-exclusion.

Because some consumers switch from non-dental to dental whitening, the exclusion shifts out demand for dental whitening. If the supply curve for this service is perfectly elastic, then this shift in demand will not change the price of dental whitening services. This corresponds to the assumption underlying Figure 3, where the line representing  $U_D$  did not shift from its pre-exclusion position. If instead the supply curve for dental whitening is upward-sloping, then the increased demand for dental

<sup>63</sup> It is straightforward to show that  $\theta_D^1 > \theta_{ND}^0$ . Recall that  $\theta_{ND}^0$  represents the  $\theta_i$  of a consumer who, pre-exclusion, is indifferent between non-dental whitening and not buying at all, and who strictly prefers both of those choices to dental whitening. Nothing changes for this consumer when non-dental whitening is excluded, and the removal of an irrelevant alternative cannot affect the ranking of the remaining choices, so not buying must still be strictly preferred to dental whitening post-exclusion. The consumer who, post-exclusion, is indifferent between dental whitening and not buying must have a higher  $\theta_i$  than this. A similar argument can be used to show that  $\theta_D^1 < \theta_D^0$ .



whitening will lead to an increase in the equilibrium price, and thus cause a downward shift of the  $U_D$  line, leading to additional consumer harm relative to the pre-exclusion equilibrium.

The supply curve for dental teeth whitening may in fact be upward sloping, due to a scarcity of dentist-specific factors of production, including dentist labor as well as the capital and knowhow that are required to operate a dental practice. Higher post-exclusion demand increases the prices of these factors, and also increases the producer surplus of the owners of these factors – particularly dentists. It is worth noting that the exclusion-induced increase in these factor prices may influence the prices other services provided by dentists, and not just teeth whitening.

In the model above, exclusion of non-dental whitening makes all consumers weakly worse off, even under an assumption (a large number of identical and competing sellers of both dental and non-dental whitening services) that ruled out the possibility of conventional market power. This means that harm from exclusion would be present even in dental markets that are very competitive. If the exclusion occurs in a setting that allows dental firms to exploit market power, then there will be additional harm to consumers.

## 2. Possible Justifications for Excluding Non-Dental Teeth Whitening

Possible justifications for exclusionary professional restrictions do exist. Virtually all of them involve claims that the restrictions are needed to prevent inefficiently low levels of quality and/or safety. For example, requiring licensing for certain professions has been justified on the basis of adverse selection concerns (Leland, 1979), moral hazard concerns (Shapiro, 1986), and paternalistic motivations, among other things. While there is debate as to the appropriate scope of professional licensing (whose goals may be achievable through the less restrictive alternative of certification), these arguments are sufficient to create a reasonably broad consensus that some healthcare services should only be provided by a licensed physician or dentist.<sup>64</sup>

Some of these justifications might also be used to justify scope-of-practice restrictions on lower-level providers, such as advanced practice registered nurses (APRNs) and dental hygienists.<sup>65,66</sup> More relevant for this paper, some might (or might not) justify exclusion of non-dentist teeth whitening. But for our purposes, it is sufficient to note that any such justification must be based on quality and/or safety problems with non-dental whitening; a finding that non-dental whitening raises no major quality or safety issues is a sufficient condition for exclusion to be unjustified.

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<sup>64</sup> See FTC (2014a).

<sup>65</sup> See FTC (2014a).

<sup>66</sup> Some clearly do not. For example, the fact that doctors and lower-level providers can be easily distinguished eliminates the asymmetric information problem. See also Tabarrok & Cowen (2015) for an argument that asymmetric information generally is decreasing throughout the economy.

### 3. Empirical Research Literature

There is a substantial empirical literature on the price effects of professional licensing restrictions, including scope-of-practice restrictions on lower-level healthcare providers, which is the type of restriction that is closest (though still not very close) to exclusion of non-dentist teeth whitening. This literature mostly finds that stronger restrictions lead to higher prices.<sup>67</sup> This is unsurprising, as it is the result predicted by theory. The more important empirical question for our purposes is whether these restrictions increase safety and quality.<sup>68</sup>

The literature on the quality effects of exclusion is much smaller than the literature on price effects. It mostly finds that more restrictive licensing regimes do not increase quality.<sup>69</sup> For example, Kleiner & Kudrle (2000) find that U.S. Air Force recruits from states with stricter dentist licensing requirements did not have better dental health. Wanchek (2010) finds that stricter scope-of-practice restrictions that limit the functions that dental hygienists can perform reduces dental office visits. This reduction in access may result in worse outcomes for patients. Kleiner et al. (2014) show that greater restrictions on the ability of nurse practitioners to perform well-child exams do not improve healthcare outcomes, as reflected by infant mortality rates or malpractice insurance premiums. In sum, the limited evidence that exists does not support the claim that professional licensing restrictions, at least the ones that have been selected for study, generally improve quality.

#### C. Case-specific Evidence

As noted above, theory and empirical evidence support a strong prior that exclusion of lower-level providers usually increases prices. Nothing about the specifics of teeth-whitening suggests that it is likely to be unusual in this regard. Though the empirical evidence cited above comes from forms of exclusion that are somewhat different than the exclusion of non-dental teeth whitening, it is still directly on point, as the complete exclusion attempted by the Board is more extreme than most of the restrictions that have been studied in the literature.

As also noted above, any valid justification for exclusion of non-dental teeth whitening must be based on quality and/or safety concerns. Since the research literature on quality is not very informative on this question, it should be resolved by a direct factual inquiry. This inquiry was a central element at trial.

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<sup>67</sup> See Council of Economic Advisers (2015), Kleiner (2015), and Svorny (2000). However, this result is not universal. For example, Stange (2014) finds that expansion of the supply of nurse practitioners and physician assistants does not always increase primary care utilization, but rather only does so in those areas that grant them the greatest autonomy to practice independently.

<sup>68</sup> If it were to turn out that licensing restrictions *did* systematically increase quality, then the literature on price effects would be needed for any attempt to balance the benefits against the harm. But as shown below, this is not the case.

<sup>69</sup> See Council of Economic Advisers (2015), particularly the Research Appendix; and Kleiner (2015) for recent surveys of this literature.

Both sides retained experts on dental quality.<sup>70</sup> In its ruling, the FTC concluded that non-dental teeth whitening was in fact safe.<sup>71</sup> Had there been a finding that non-dental whitening was unsafe, such that there would be a quality or safety benefit from its exclusion, and had a court found that benefit to be cognizable under the antitrust laws, then it would have been necessary to evaluate whether the benefit could have been achieved through alternative, less restrictive means, and if not, to balance that benefit against the competitive harm. Since there was no such finding, this was not necessary.

In the foregoing, we argued that theory and empirical research were not sufficiently on point to provide a basis for strong priors regarding the likely quality and safety benefits of excluding non-dental teeth whitening, and that the issue needed to be resolved through case-specific inquiry. But the question remains of what inference to draw from the fact that the Board claimed in this matter that non-dental whitening was unsafe, and that many of the restrictions studied in the research literature – restrictions that were not found to improve quality – were nevertheless defended on quality grounds by professional entities similar to the Board.

On the one hand, these entities would appear to have relevant expertise. On the other hand, they, or the professionals that they represent, have economic interests in limiting competition. A key element of the state action issue that was central to this case is that the Board – most of whose members are dentists and are elected by dentists – cannot be relied upon to act in a manner contrary to their economic interests. This same idea has recently been expressed by the FTC in a number of forums.<sup>72</sup>

#### D. Discussion

Exclusion in the context of professional services is sometimes necessary; for example, few would dispute the need for restrictions on the unlicensed practice of brain surgery. But circumstances may support a strong prior belief that exclusion is likely to be anti-competitive. This is the unsurprising result of our simple model, and it is also the result of a wealth of empirical evidence. Arguments that exclusion is necessary should be treated skeptically, especially when those arguments are offered by parties that will remain in the market following exclusion and may benefit from the lessening of competition. The case-specific evidence in this matter, the most important of which was the finding that non-dentist teeth whitening is safe, did not provide any basis for overturning those priors.

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<sup>70</sup> Dr. Martin Giniger testified at trial as an expert in dental quality on behalf of the FTC, and Dr. Van Haywood testified as an expert in dental quality on behalf of the Board.

<sup>71</sup> See Opinion of the Commission (Dec. 7, 2011) at 26 and 28, available at <https://www.ftc.gov/sites/default/files/documents/cases/2011/12/111207ncdentalopinion.pdf>.

<sup>72</sup> See Opinion of the Commission (Dec. 7, 2011) at 15, FTC (2014a) at 15, and Ohlhausen and Luib (2015).

## VI. Conclusion

As this article demonstrates, FTC economists utilize a diverse set of economic tools to analyze a wide range of important issues. The span of topics covered here also demonstrates that the focuses of these analyses can be very new phenomena, such as manipulation of technologies in mobile billing, or practices as old as professions that try to exclude potential competitors. In any case, the main challenge that faces an FTC economist is to determine and execute the mode or modes of economic analysis that can best inform the Commission about the issue, and aid the Commissioners in making decisions that have positive results for consumers and the economy.

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