Economics at the FTC: Fraud, Mergers and Exclusion

David J. Balan
Patrick DeGraba
Francine Lafontaine
Patrick McAlvanah
Devesh Raval
David Schmidt

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 matter, 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

Address for all authors but Lafontaine:
Federal Trade Commission, Bureau of Economics
600 Pennsylvania Ave., N.W.
Washington, DC 20580, USA
Lafontaine address:
Ross School of Business, University of Michigan
Ann Arbor, MI 48109, USA

Acknowledgements We thank James Lacko, Janis Pappalardo, Andrew Stivers, and Michael Vita for helpful comments and Marissa Wheeler for considerable research assistance. The views that are expressed in this article are those of the authors and do not necessarily reflect those of the Federal Trade Commission or any of the individual Commissioners.

Note: a final version of this paper was published in the December 2015 issue of the Review of Industrial Organization (47:4) pages 371-398.

I. Introduction

A.

complaints that related to problems such as identity theft and imposter scams.[4] 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.[5] 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.[6] 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.[7]

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.[8] 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.[9]

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.

---

[4] See https://www.ftc.gov/annual-highlights-2014/stats-data-2014.
[5] FTC & Department of Justice (2015).
[6] FTC & Department of Justice (2015) at 5.
[7] 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.
[8] Conference materials can be found at https://www.ftc.gov/news-events/events-calendar/2014/10/seventh-annual-federal-trade-commission-microeconomics.
[9] 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 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 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.[10] This section summarizes the economic analysis that was conducted in these cases.

[10] 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

First, to achieve effective deterrence and inducefficient 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

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.[16] 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.[17] Refund rates for PSMS were also an order of magnitude

$$g(\mathbf{x}_i) = \sum_{j=1}^{M} \lambda_j \prod_{k=1}^{R} f_{jk}(x_{ik}) \qquad (8)$$

There are M types of content providers in the population; type j has proportion λ_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 of 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.[20]

We applied the statistical algorithms of Benaglia et al. (2009a) and Levine et al. (2011) to estimate the non-parametric finite mixture model, that 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 provide content pr(r a maj3.52(m)8(8emnd4rs ie2J /Te the second

consumer
Relative to a less structural approach, the mixt
economi analysis: First, the mixture model takes into acco
9d var– unlik .0for example, labeling a content provider as a
81he structural assum
model

E. Discussion

Both the T-Mobile and AT&T cases concluded with 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 clear 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.[21]

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.[22] 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 consumers' susceptibility to fraudulent advertising.

[21] 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).
[22] See FTC (2014b).

“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 the weight loss ad, or skeptical solely of weight loss ads that promise guaranteed and significant weight loss.

Finally, we also designed four advertisements to represented typical advertisements for products

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.[23]

We consider three research questions: (1) What characteristics are associated with subjects'

For the plausible ads, we found that people with greater numeracy and people who are relatively overconfident rated these ads as more credible than 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, whereas 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 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. 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 several 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 reading 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.[24] 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 "roof 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 images; human labor (with some computer

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 of 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.[25]

EagleView pioneered the software that calculates dimensions from roof outlines in 2006, and claims patents on this software.[26] EagleView's initial business model included purchasing the rights to use aerial images from Pictometry International: the largest seller of high-resolution aerial images, with a library that covered over 90% of the structures in the United States.[27]

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[28] 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.[29] 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 RoofSight. It also made substantial progress in amassing its own high-resolution image library.[30] EagleView enabled other cost estimation software to access its roof reports electronically.

In October of 2012, EagleView initiated a patent 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[31] and served 24 of the 25 largest insurance carriers.[32] Verisk's Aerial Sketch and Roof InSight accounted for essentially the rest.[33] Thus, the merger would have brought 99% of the RAMP for insurance purposes[34] and the two best aerial image libraries under Verisk's ownership.

85% of all insurance carriers used Xactimate to process their claims,[35] 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.[36]

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.[37]

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.[38]

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 on 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,[39] and upon internal company documents that indicated that executives expected that Roof Insight would be sold at a discount relative to EagleView.[40]

---

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.

[31] See Complaint at ¶ 3.

[32] See Complaint at ¶ 18.

[33] See Complaint at ¶ 3.

[34] See Complaint ¶ 29.

[35] See Complaint at ¶ 20.

[36] See Complaint at ¶ 21.

[37] See Complaint ¶ 38 and 39.

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

[39] See Complaint ¶39. Note that if these customers could be served for a particular property by Roof InSight, they could go back to EagleView for a dimension estimate.

[40] See Complaint ¶ 39.

A second source of harm involved EagleView's asserted patents. EagleView had used patent infringement suits to cause several small RAMP entrants to exit the market.[41] 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 stronger incentives to litigate the patents' validity.[42] 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.[43]

The complaint excluded manual measurement from the market.[44] 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 led prices to others as competition increased. If the merger were consummated, then those customers that received lower prices from Verisk would likely

[41] See Complaint ¶ 44.
[42] See Complaint ¶ 35.
[43] See US Department of Justice and FTC (2010), henceforth Guidelines, at 8.
[44] See Complaint at ¶ 26.

First, since Verisk was in the process of creating 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.[49]

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 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.

---

[49] 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 should 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.[50] 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 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

The Board also sent letters to the owners of mall 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.[54]

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 .0004 Tq4edings molso se-5.92

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 setting, 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 dentists' labor and expensive dental practice equipment, and the non-dental whitening firms employ much cheaper non-dentist labor and much less expensive equipment.[59]

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: $\theta_i x_j - P_j$, where θ_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 θ_i^0 such that, given prices, a consumer characterized by $\theta_i = \theta_i^0$ is indifferent between purchasing dental or non-dental whitening. There is another, lower critical value $\theta_i^{0'}$ such that a c10.98 0 0 1ch to <0005>Tj /TT2 ogegP ª5À¼p»Ð 4p, we ad

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 θ_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 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 θ_i. Total consumer surplus is the shaded area below the upper envelope of the two lines in Figure 2.[61]

Now suppose that the exclusionary conduct increases c_{ND} by enough to completely drive non-dentists out of the teeth-whitening market.[62] 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 post-exclusion consumer surplus and also the consumer harm from the exclusion.

[61] Figure 2 depicts total consumer surplus under the assumption that θ_i is uniformly distributed, but this is not central to the analysis.

[62] This is for simplicity; the effects of only part

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

The thresholds θ_{ND} and θ_D are reproduced from Figure 2 above. Consumers characterized by $\theta < \theta_D$ and by $\theta > \theta_{ND}$ are unaffected by the exclusion; their pre-exclusion choices are still available to them, at the same prices, post exclusion. Consumers characterized by $\theta_D < \theta < \theta_{ND}$ 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 θ_D^1 represents the value of θ characterizing a consumer who, post-exclusion (indicated by a 1 superscript), is indifferent between these two choices.[63] Consumers characterized by $\theta < \theta_D^1$ 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 $\theta > \theta_D^1$ 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 D_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

[63] It is straightforward to show that $\theta_D^1 > \theta_{ND}$. Recall that θ_{ND} represents the θ 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 θ.

whitening will lead to an increase in the equilibrium price, and thus cause a downward shift of the LD line, leading to additional consumer harm re

3. Empirical Research Literature

There is a substantial empirical literature on the 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.[67] 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.[68]

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.[69] 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. Wall (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.

---

[67] See Council of Economic Advisers (2015), Kleiner (2013), and Svorny (2000). However, this result is not universal. For example, Stange (2014) finds that expansions of the supply of nurse practitioners and physiis .2( )6((201)-4.9(4)pe

Both sides retained experts on dental quality.[70] In its ruling, the FTC concluded that non-dental teeth whitening was in fact safe.[71] Had there been a finding that non-dental whitening was unsafe, such that

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.

VII. References

Adams, C. (2015). Finite mixture models with one exclusion restriction. Retrieved October 19, 2015, from the Social Science Research Network's Web site: http://ssrn.com/abstract=2572583

Allman, E. S., Matias, C., & Rhodes, J. A. (2009). Identifiability of parameters in latent structure models with many observed variables. The Annals of Statistics, 3099-3132.

Anderson, Keith B. (2013). Consumer Fraud in the United States: The Third FTC Survey. Staff Report of the Bureau of Economics. Retrieved October 19, 2015, from FTC Web site: https://www.ftc.gov/sites/default/files/documents/reports/consumer-fraud-united-states-2011-third-ftc-survey/130419fraudsurvey_0.pdf

Balan, D. J., & Deltas, G. (2013). Better products at same cost, lower sales and lower welfare. International Journal of Industrial Organization, 31(4), 322–330.

Balan, D. J., & Deltas, G. (2014). Better products at same cost: Leader innovation vs generic product improvement. The Analysis of Competition Policy and Sectoral Regulation, 93–113.

Benaglia, T., Chauveau, D., & Hunter, D. R. (2009). An EM-like algorithm for semi-and nonparametric estimation in multivariate mixtures. Journal of Computational and Graphical Statistics, 18(2), 505-526.

Benaglia, T., Chauveau, D., Hunter, D., & Young, D. (2009b). mixtools: An r package for analyzing finite mixture models. Journal of Statistical Software, 32(6), 1-29.

Bonhomme, S., Jochmans, K., & Robin, J. M. (2014). Nonparametric estimation of finite mixtures (No. CWP11/14). Retrieved October 19, 2015, from the Centre for Microdata Methods and Practice Web site: http://www.cemmap.ac.uk/wps/cwp111414.pdf

California Public Utilities Commission. (2013). Letter to Melanie K. Tiano, Senate Committee on Commerce, Science, and Transportation, Re: Inquiry Regarding Wireless California Cramming Complaint Data. Retrieved October 19, 2015, from FCC Web site: http://apps.fcc.gov/ecfs/document/view?id=7022119377.

Council of Economic Advisers (2015). Occupational licensing: A framework for policymakers. Retrieved October 19, 2015, from White House Web site: https://www.whitehouse.gov/sites/default/files/docs/licensing_report_final_nonembargo.pdf

Federal Trade Commission. (2014a). Competition and the regulation of advanced practice nurses. Retrieved October 19, 2015, from Federal Trade Commission Web site: https://www.ftc.gov/system/files/documents/reports/policy-perspectives-competition-regulation-advanced-practice-nurses/140307aprnpolicypaper.pdf

Federal Trade Commission. (2014b). Mobile Cramming: An FTC Staff Report. Retrieved October 19, 2015, from FTC Web site: https://www.ftc.gov/system/files/documents/reports/mobile-cramming-federal-trade-commission-staff-report-july-2014/140728mobilecramming.pdf

Federal Trade Commission & Department of Justice (2015). Hart-Scott-Rodino Annual Report, Fiscal Year 2014. Retrieved October 19, 2015, from FTC Web site: https://www.ftc.gov/system/files/documents/reports/federal-trade-commission-bureau-competition-department-justice-antitrust-division-hart-scott-rodino/15c.18a-hart-scott-rodino-antitrust-improvements-act-1976/150813hsr_report.pdf

Gaynor, M. (2006). What Do We Know About Competition and Quality in Health Care Markets?" Foundations and Trends in Microeconomics, 2, 6.

Hall, P., Neeman, A., Pakyari, R., & Elmore, R. (2005). Nonparametric inference in multivariate mixtures. Biometrika, 92(3), 667-678.

Hall, P., & Zhou, X. H. (2003). Nonparametric estimation of component distributions in a multivariate mixture. Annals of Statistics, 201-224.

Hirschman, A. O. (1970). Exit, voice, and loyalty: Responses to decline in firms, organizations, and states. Harvard University Press.

Kasahara, H., & Shimotsu, K. (2014). Nonparametric identification and estimation of the number of components in multivariate mixtures. Journal of the Royal Statistical Society: Series B (Statistical Methodology), 76(1), 97-111.

Kleiner, M. M. (2015). Reforming Occupational Licensing Policies. Hamilton Project Discussion Paper, 2015-01.

Kleiner, M. M., Marier, A., Park, K. W., & Wing, C. (2014). Relaxing Occupational Licensing Requirements: Analyzing Wages and Prices for a Mid Service (No. w19906). National Bureau of Economic Research.

Kleiner, M. M., & Kudrle, R.T. (2000). Does regulation affect economic outcomes? The case of dentistry. Journal of Law & Economics, 43(2), 547–582.

Leland, H. E. (1979). Quacks, lemons, and licensing: A theory of minimum quality standards. Journal of Political Economy, 87(6), 1325–1346.

Levine, M., Hunter, D. R., & Chauveau, D. (2011). Maximum smoothed likelihood for multivariate mixtures. Biometrika, 98(2), 403-416.

McAlvanah, P., Anderson, K., Leibtag, E., & Mountjoy, J. (2015). Fraudulent Advertising Susceptibility: An Experimental Approach. Federal Trade Commission Bureau of Economics Working Paper #325. Retrieved October 19, 2015, from FTC Web site: https://www.ftc.gov/system/files/documents/reports/fraudulent-advertising-susceptibility-experimental-approach/wp325.pdf

NACHA: The Electronic Payments Association. (2013). ACH Network Risk and Enforcement Topics, Request for Comment and Request for Information, Executive Summary and Rules Description. Retrieved October 19, 2015, from http://www.ballardspahr.com/~/media/files/alerts/2013-11-25-nacha.pdf

Ohlhausen, M. K., & Luib, G. P. (2015). Brother, may I?: the challenge of competitor control over market entry. Journal of Antitrust Enforcement. Retrieved October 19, 2015, from http://antitrust.oxfordjournals.org/content/early/2015/09/10/jaenfo.jnv028.abstract

Shapiro, C. (1986). Investment, moral hazard, and occupational licensing. The Review of Economic Studies, 53(5), 843-862.

Sims, C. A. (2003). Implications of rational inattention. Journal of Monetary Economics, 50(3), 665-690.

Stange, K. (2014). How does provider supply and location influence healthcare markets? Evidence from nurse practitioners and physician assistants. Journal of Health Economics, 33, 1–27.

Svorny, S. (2000) Licensing, Market Entry Regulation. Encyclopedia of Law & Economics, Vol. III, The Regulation of Contracts, pp. 296-328.

Tabarrok, A., & Cowen, T. (2015). The end of asymmetric information. Cato Unbound. Retrieved October 19, 2015, from http://www.cato-unbound.org/2015/04/06/alex-tabarrok-tyler-cowen/end-asymmetric-information