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Economics at the FTC: Spatial Demand, Veterinary Hospital Mergers, Rulemaking, and Noncompete Agreements

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Abstract
The U.S. Federal Trade Commission enforces federal competition and consumer protection laws that prevent anticompetitive, deceptive, and unfair business practices, and works to advance government policies that protect consumers and promote competition. The FTC's Bureau of Economics performs economic analysis to support both the enforcement and policy activities of the Commission. This article discusses several examples of these activities. We first discuss some work our economists have done on spatial considerations in demand estimation, and then present an analytical approach that has been developed to assess consumer choice between service providers with the use of data on geographic variation in the location of the customers of two merging service providers. We apply this technique in the context of the analysis of the competitive effects of a merger of veterinary hospitals. Next, we discuss an important tool in the FTC's arsenal: rulemaking. We describe the benefits and costs of rulemaking, the rulemaking process, and the role of economic analysis in that process, and then highlight recent FTC rulemaking activities and the economic analysis of a proposed rulemaking that would ban employers from imposing non-compete clauses in employment contracts.

Keywords Antitrust · Consumer protection · FTC · Mergers · Rulemaking

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1 Introduction

The U.S. Federal Trade Commission (FTC) enforces federal competition and consumer protection laws that prevent anticompetitive, deceptive, and unfair business practices, and works to advance government policies that protect consumers and promote competition. The FTC's decisions are informed by economic analyses that are performed by the economists, financial analysts, and statisticians in the Bureau of Economics (BE).

The FTC is primarily a law enforcement agency and enforces federal competition and consumer protection laws—although it also fulfills its missions in various other ways including rulemaking, research, studies on marketplace trends, public outreach, and consumer and business education. BE's staff—which currently consists of over 80 Ph.D. economists, nine research assistants/statisticians, eight financial analysts, and five administrative professionals—perform a wide range of analyses across broad sectors of the economy.

In this article we focus on several examples of economic analysis that BE has done in support of the FTC's law enforcement investigations and rulemakings. In addition, BE economists also conduct economic research to address important economic issues. BE economists may collaborate with colleagues from across the FTC on commission studies and reports that may or may not relate directly to ongoing enforcement activities or policy initiatives. One example of such a study is an inquiry with respect to pharmacy benefit managers (PBMs) that was announced in June of 2022.[1] The Commission voted to require the six largest PBMs to provide information and records with regard to their business practices so as to enable staff to study the impact of vertically integrated PBMs on the access and affordability of prescription drugs. BE economists also work on more narrowly focused research projects that often are disseminated in the form of working papers and academic journal articles.

BE maintains connections with the academic economic research community through a weekly seminar series and by organizing the annual FTC Microeconomics Conference (sponsored by the Tobin Center for Economic Policy at Yale). The 2023 conference (the 16th installment) featured paper sessions and keynote addresses by academics on the Scientific Committee this year.[2]

Throughout the past year, FTC economists have provided economic analysis in connection with numerous high-profile antitrust investigations, including Meta-Within, Microsoft-Activision, Illumina-Grail, ICE-Black Knight, and Altria-Juul.[3] This casework often presents challenges in terms of modeling novel economic

[1] See FTC press release, https://www.ftc.gov/news-events/news/press-releases/2022/06/ftc-launches-inquiry-prescription-drug-middlemen-industry (last accessed July 6, 2023).

[2] Conference materials are posted at https://www.ftc.gov/news-events/events/2023/11/sixteenth-annual-microeconomics-conference.

[3] See case materials at https://www.ftc.gov/legal-library/browse/cases-proceedings/221-0040-metazuckerbergwithin-matter, https://www.ftc.gov/legal-library/browse/cases-proceedings/2210077-microsoftactivision-blizzard-matter, https://www.ftc.gov/legal-library/browse/cases-proceedings/201-0144-illumina-inc-grail-inc-matter, https://www.ftc.gov/legal-library/browse/cases-proceedings/221-0142-intercontinental-exchange-incblack-knight-inc-matter, and https://www.ftc.gov/legal-library/browse/cases-proceedings/191-0075-altria-groupjuul-labs-matter.

environments and/or analyzing large amounts of data. However, the cumulative effect of mergers in small markets can matter just as much as high profile mergers (Wollmann, 2020). FTC economists continue also to provide support for investigations in relatively lower-profile industries in which data may be somewhat more limited, which can present its own problems.

In Sect. 2 of this article, we start with a discussion of research by BE economists on spatial markets, including the use of location information for demand estimation. We then describe a method of economic analysis that can be utilized to examine the loss of competition that results from a merger when we possess detailed information about only the merging parties' customers (and not about the customers of non-merging rivals). One can use the detailed data from the merging parties to estimate parameters in a choice model, and then infer customer preferences for non-merging competitors. We show how to apply this approach in the context of veterinary hospital mergers.

In Sect. 3 we cover rulemaking, as the FTC is now undertaking several new rulemakings. We first discuss the benefits and costs to rulemaking as opposed to enforcement of the FTC's Section 5 standard that prohibits deceptive and unfair acts and practices or unfair methods of competition. We then provide an overview of the process under which the FTC can issue regulations or rulemakings; we pay special attention to the economic analysis that may be performed as part of that process. The section also discusses recent FTC rulemakings, including some of the economic analysis that was performed for an FTC notice of proposed rulemaking to ban (with limited exceptions) employers from imposing non-competes on their workers.

2 Demand Estimation and Spatial Markets: FTC Research and An Application to Veterinary Hospital Mergers with Limited Customer Data

A proposed merger may eliminate substantial competition between the merging firms. One way to assess the degree of competition that may be at risk is to gather evidence on how likely consumers are to switch between the firms' products or services. In spatial markets, the distance between firms and consumers may be a key driver of substitution patterns.

In this section, we first discuss the research by economists in BE on the role of distance in consumer demand and firm competition in spatial markets. This research develops new models of spatial demand, examines the predictive power of such models, investigates the reasons why distance matters in spatial markets, and shows how the location of merging parties affects estimates of merger effects from retrospectives.

We then discuss an application that highlights a key difference between the process of academic research and agency enforcement. As the FTC's research on spatial markets demonstrates, microdata can be very helpful to estimate the effects of distance on spatial demand and then conduct merger simulations. Empirical work by academics typically relies on datasets with information on most if not all competitors in an industry—such as all-payer healthcare claims data or the Nielsen

Homescan dataset—or is specific to one firm, such as Dominick's Foods in Chicago or platforms such as eBay or Airbnb.

Economists at the FTC use such data when appropriate for the economic analysis that is performed for a merger investigation. However, an enforcement agency can often obtain additional detailed microdata—such as consumer loyalty card information—from both merging parties but not from other firms. It can be costly and difficult to obtain data from third parties to the transaction, and the time constraints of the merger process can make it hard to obtain and combine several firms' data.

In this section, we show one approach that has been taken by FTC economists to tackle the challenge of using such data in the context of merging veterinary hospitals. Using only the datasets of the merging parties, we describe an approach to identify the disutility of distance—a key driver of consumer substitution patterns—and then estimate how close competitors the merging parties are.

2.1 FTC Research on Spatial Markets

When demand is spatial, consumers generally prefer options that are located closer to them, all else equal. Economists have traditionally modeled spatial demand through a measure of distance, such as travel time, that enters linearly or quadratically in utility. However, spatial preferences may not depend only on a singular distance measure: for example, consumers may prefer not to cross bridges or enter certain neighborhoods. FTC economists have been researching these issues actively, starting with a discussion by Hosken and Tenn (2016) of the application to retailing of spatial demand models that allow for non-parametric distance preferences.

Raval et al. (2017) develop a computationally light semiparametric estimator that flexibly estimates substitution patterns that allow for more general preferences. The semiparametric model first partitions patients into groups that are based upon patient characteristics, with the use of patient zip code as the measure of location. A group might be identified by the combination of a patient zip code, age, disease severity, and diagnosis category. One can then estimate choice probabilities and substitution patterns by assuming that substitution is proportional to share within each group; thus, the model is equivalent to an extremely flexible multinomial logit model with thousands of interactions of several different patient characteristics. This semiparametric model can be estimated extremely quickly and easily, as compared with the parametric multinomial logit.

The key tuning parameter is the minimum size of a group, which regulates a bias-variance tradeoff: larger groups result in an estimator with greater bias but lower variance. By varying this parameter, the researcher can quickly adjust the degree of flexibility of the model and examine the robustness of any findings. Lau (2023) and Panhans (2023) implement this estimator in Stata and R, respectively; academic research is increasingly using it to model spatial demand (e.g., Barrette et al., 2022). Raval et al. (2021) show how to extend the grouping approach to apply machine learning models such as random forests and gradient boosting trees to spatial demand.

FTC economists often estimate spatial models of demand to utilize in merger simulations. Assuming a Nash-in-Nash bargaining framework, Balan and Brand (2023) show that merger simulations of hospital mergers provide a better guide to merger effects with more accurate estimates of hospital demand. Raval et al. (2017) apply their estimator to hospital mergers. In Monte Carlo simulations, they find that the semiparametric estimator predicts well the proxies for merger harm such as diversion ratios and willingness to pay in several scenarios—including when utility is linear in travel time as the parametric multinomial logit assumes.

Raval et al. (2022) assess how well spatial demand models predict diversion ratios through "natural experiments". They exploit a set of natural disasters—two tornadoes (in Georgia in 2007, and in Oklahoma in 2013), the Northridge earthquake (in Southern California in 1994), and Superstorm Sandy (in New York in 2012)—that temporarily destroyed six hospitals. The markets range from large urban areas to rural settings, and the hospitals include major academic medical centers and community hospitals, which increases the likelihood of external validity from the events.

These disasters allow one to observe where patients go when they cannot go to their first-choice hospital, and so provide an experimental analogue to the exclusion of a hospital from a health insurer's network. Raval et al. (2022) compare the semiparametric estimator to spatial demand models that use travel time—including Capps et al. (2003), Ho (2006), and Gowrisankaran et al. (2015)—and that include flexible interactions between patient and hospital characteristics. They find that the semiparametric model is better at predicting individual choices than these alternative models, and equally predictive of aggregate diversion ratios.[4]

However, Raval et al. (2022) also show that all of the demand models systematically underpredict diversion to the hospitals with the largest observed diversion ratios. A ten percentage point increase in the observed diversion ratio increases the gap between the predicted and observed diversion ratios by 3.5–4.3 percentage points. Because the models tend to underpredict diversion to nearby options, the inclusion of a random coefficient on travel time could allow for the possibility that patients of the destroyed hospitals were more sensitive to distance than was the average patient. Model predictions of aggregate diversion ratios improve by 20–25% after including such a random coefficient. Thus, Raval et al. (2022) conclude that random coefficients on distance can improve prediction of spatial demand—even when rich microdata allows flexible controls for observed heterogeneity.

FTC economists also use merger retrospectives to evaluate merger simulation models and assess the effects of mergers (Garmon, 2017); in spatial markets, merger effects can vary based on the location of the merging parties. Ashenfelter et al. (2015) examine the Miller–Coors beer merger and find efficiencies from redistributing production between Miller and Coors breweries that reduced prices in markets far from a Coors brewery pre-merger. Brand, Garmon, and Rosenbaum

[4] Raval et al. (2021) find that two machine-learning models—random forests and gradient boosting trees—outperform all of the other models at individual choice prediction, although the machine-learning models' performance suffers when addressing patients who were most likely to go to the destroyed hospital and so experience a change in their choice set.

(forthcoming) find that price effects of hospital mergers generally decline in the distance between the merging hospitals. However, economists have also found evidence of price effects from mergers of hospitals that operate in different local markets (Brand & Rosenbaum, 2018); Brand, Garmon, and Rosenbaum (forthcoming) find price effects for in-state—but not out-of-state—hospital mergers that are in different localities.

While distance is a strong predictor of demand in spatial models, it is not clear whether this relationship is causal. Distance effects could reflect transport costs or that distance is correlated with unobserved consumer preferences: this is a phenomenon that is known as home bias. Raval and Rosenbaum (2021) examine women's choices of hospital for childbirth and separate the two effects with the use of women who move between births and switch hospitals. If transport costs are large, women should typically switch to hospitals near their new residence. Raval and Rosenbaum (2021) find that the effect of distance decreases by 40% after accounting for home bias.

One potential explanation for this difference is that the conditional logit model that is used in Raval and Rosenbaum (2021) did not allow for switching costs. However, Raval and Rosenbaum (2018) estimate both distance and switching costs in the same context and find similar, lower estimates of transport costs after controlling for home bias. Because estimates of switching costs also decrease after controlling for unobserved heterogeneity, patients' trade-offs between distance and switching costs remain the same.

Raval and Rosenbaum (2021) show that referral patterns likely explain part of the home bias effects by magnifying the effects of distance on demand. Consistent with this explanation, controlling for the hospitals at which the operating physician at birth practices can explain about half the gap between the estimate of distance in a standard logit model and the estimate after accounting for home bias. In simulations, Raval and Rosenbaum (2021) show that the home bias from ignoring referral patterns can understate the welfare harm that can follow from hospital mergers.

While this section has focused on antitrust applications for spatial demand models, such models also apply to cross-border fraud, which is a major concern for the FTC's consumer protection mission. Grosz and Raval (2023) build a model of trade that includes fraud: the model predicts that cross-border fraud—similar to trade flows—should generally decline with distance. They then empirically verify this prediction with the use of consumer complaint data from three datasets—although physical distance matters less and cultural distance matters more for fraud complaints as compared to trade. Finally, Grosz and Raval (2023) use these models to identify hotspots for cross-border fraud, including West Africa and the Caribbean.

We now turn to veterinary care: this is a market in which FTC economists have used spatial demand models to analyze the predicted effects of a proposed merger.

2.2 Veterinary Care

Veterinary care is a unique health care market to study. First, unlike humans, few pets are covered by health insurance, and pet health insurance is not subsidized by governments in the way human health insurance is.[5] Thus, the pricing of health care works very differently for pets as compared to humans. Nevertheless, Einav et al. (2017) document several similarities between human and pet health care. In addition, referrals are much less important for pet health care as compared to human health care.

Consumers seek emergency veterinary care or veterinary specialist care—for example, the services of a veterinary oncologist, who would render care in a similar manner to an oncologist treating cancer in humans—by traveling to emergency or specialty veterinary clinics. These clinics are distinct from general practice veterinary care—just as a family practice group is different from an emergency room or specialist medical practice for human patients. The difference is in terms of the facilities and equipment employed, as well as in the qualifications of the medical practitioners. Specialist veterinarians, in addition to their Doctor of Veterinary Medicine (DVM) degree, complete a residency in their chosen specialty. Of the over 100,000 practicing DVMs in the United States in 2022, approximately 14,000 were veterinary specialists.[6] Of the approximate 30,000 veterinary clinics in the United States in 2021, 12–15% were accredited as 24-h emergency clinics by the American Animal Hospital Association, based on their anesthesia monitoring and disease prevention practices.[7]

The FTC recently investigated a series of veterinary hospital mergers. In August 2017, the FTC settled with Mars, Inc. in its acquisition of pet care company VCA: The FTC required the divestiture of 12 specialty and emergency veterinary hospitals that left competition within local markets unaffected by the larger transaction. In February of 2020, the FTC similarly settled with Compassion First Pet Hospitals in its acquisition of National Veterinary Associates: The FTC required the divestitures of veterinary hospitals in three geographic areas.[8] Finally, in June 2022, the FTC required JAB (owner of Compassion First/NVA pet hospitals)—in the context of JAB's serial acquisitions of SAGE Veterinary Partners, LLC, and Ethos Veterinary Health, LLC—to divest specialty and emergency pet hospitals in several geographies in addition to imposing strict limits on future acquisitions.[9]

[5] Less than 5% of dogs and 2% of cats are insured. See https://naphia.org/wp-content/uploads/2023/05/NAPHIA-SOI2023-Report-Highlights_Public-May9.pdf for data on the number of insured dogs and cats in the US in 2022, and https://ebusiness.avma.org/files/ProductDownloads/eco-pet-demographic-report-22-toc-introduction.pdf for data on the number of pet dogs and cats in 2022 in the US.

[6] See the American Veterinary Medical Association's reports on the profession at https://www.avma.org/resources-tools/reports-statistics. Specialists include all active board-certified diplomates as of December 2021.

[7] See https://www.veterinarypracticenews.com/24-hour-emergency-vet-clinics/.

[8] See https://www.ftc.gov/news-events/news/press-releases/2017/08/ftc-requires-mars-divest-12-veterinary-clinics-condition-acquiring-pet-care-company-vca-inc.

[9] See https://www.ftc.gov/legal-library/browse/cases-proceedings/2110140-jab-consumer-partnersnational-veterinary-associatessage-veterinary-partners-matter.

An important consideration in analyzing competition between veterinary hospitals is the role of hospital location. Much like human health care, customers or patients prefer to use animal hospitals that are nearby, so hospitals compete more intensely when they are close to each other (other things equal). Hence, a merger of emergency or specialty veterinary hospitals located near each other that offer comparable services may diminish local competition amongst the hospitals for the same consumers. One way to assess the scope of competition between nearby hospitals is to estimate diversion ratios and the consequent upward pricing pressure that is associated with a combination of the merging parties' hospitals that are located even considerably distant from one another.[10] This approach to identifying the competitive hospitals does not require the delineation of geographic markets that include or exclude any set of hospitals.

2.3 Demand Estimation

To assess the competitive effects of the merger, we use customer-level data supplied by the merging parties. While these data are very rich in the sense of providing information about the geographic locations of customers and service providers, only the customers of the merging party hospitals are present. In contrast, the discharge data that we generally use to analyze patient choice in the context of inpatient hospital mergers for humans include all inpatient discharges for facilities that are located in a U.S. state. Not having data on the customers who chose the non-merging hospitals can make it difficult to assess the extent to which consumers view those as substitutes for the merging hospitals.

We discuss below a methodology that we developed to use these limited data to infer the disutility of distance for customers—which can help define geographic markets. With some additional assumptions, we can also estimate diversion ratios—the share of consumers who would divert to the merging partner were one party hospital to be unavailable—from each merging party hospital to the merging partner's facilities. Given these diversions and estimates of the hospitals' marginal costs by service, we estimate upward pricing pressure that is created by the merger.

The merging parties supplied detailed transaction-level data for each of their owned veterinary hospitals: the date of service; the type of service rendered, including department or specialty (i.e., emergency, oncology); the geographic location of the veterinary hospital visited (latitude and longitude); and the customer address with latitude and longitude. For some of the parties' facilities, the data included more detailed information about the type of service rendered: e.g., a specific surgery, infusion, or radiation for the treatment of cancer. We observed some information on prices paid, but we could not identify standardized sets of services that were associated with those transactions that would enable the creation of a series of comparable prices or price indices across hospitals. We also had data on the physical addresses,

[10] This distance was chosen to be over-inclusive, as the draw areas for a typical emergency or specialty veterinary practice, for any area of specialty, are generally well-contained within the area that is formed by a 50-mile radius around the hospital.

driving times, and distances to all other nearby third-party veterinary hospitals that offered the same service.

We can use these data to estimate a simple conditional logit model of veterinary hospital choice in which travel distance is the only covariate. Because the data do not include reliable information about the prices that consumers paid for comparable services, we assume that prices do not vary during the period of the data sample, and that hospital-specific constants capture persistent differences in prices across hospitals. Let consumer i's utility associated with veterinary hospital j for service k be

$$u_{i,j,k} = \alpha_{j,k} - \beta_k \cdot d_{i,j} + \varepsilon_{i,j,k},$$

where $d_{i,j}$ denotes customer i's travel distance or travel time to hospital j: and $\varepsilon_{i,j,k}$ is an extreme value distributed, i.i.d. error term.

The simple conditional logit model implies that the probability that customer i chooses veterinary hospital A is

$$Pr[A] = \frac{exp(\alpha_{A,k} - \beta_k \cdot d_{i,A})}{\sum_j exp(\alpha_{j,k} - \beta_k \cdot d_{i,j})}. \quad (1)$$

Because we possess customer data for only the merging parties' veterinary hospitals, we must estimate customers' disutility of travel from only a subset of customers residing in the draw areas (the geographic region from which the hospital attracts its patients) for each veterinary hospital. McFadden (1984) establishes that one can obtain a consistent estimate of β_k from a sample that consists of observations that are conditioned on a limited subset of options being selected—in this case, the party-owned hospitals—due to the IIA property of the conditional logit model.[11] We therefore estimate the disutility of travel for each service k. We can then use this information about disutility for travel to help develop geographic markets, as well as to examine how the size of geographic markets varies by service.

2.4 Identifying Competing Locations

Diversion ratios are one approach to gauging the degree of substitutability between alternative products or services that a customer might choose. The diversion ratio measures the share of one alternative's customers that would divert to another alternative in response to an increase in its price, or to its disappearance from the choice set. Given the available data and assumption of logit demand, and consistent with Farrell et. al. (2011, p. 276), we measure diversion from one veterinary hospital A to a competitor B, for service k, as

$$\widehat{DR_{A \to B,k}} = \frac{\sum_i \widehat{Pr_{i,k}(B|exclA)} - \sum_i \widehat{Pr_{i,k}(B)}}{\sum_i \widehat{Pr_{i,k}(A)}}.$$

[11] Manski and Lerman (1977) also discuss the same result, which they attribute to McFadden.

For each customer i who sought service k and who resided within the draw area of veterinary hospital A for the same service, we sum the predicted likelihood of choosing each of A and B (denoted $\widehat{Pr_{i,k}(A)}$ and $\widehat{Pr_{i,k}(B)}$, respectively), as well as the predicted likelihood that the customer would choose hospital B in the absence of A, denoted $\widehat{Pr_{i,k}(B|exclA)}$—which (given the logit assumptions) equals $Pr_{i,k}(B)/\left(1-Pr_{i,k}(A)\right)$. The diversion ratio therefore equals the expected number of customers who would choose hospital B upon closure of A, minus the expected number of customers who choose hospital B, which equals the total number of diverted customers to B as a proportion of A's customers. For example, if hospital A and B each serve 50 customers residing within A's draw area, and the predictions of the choice model suggest that B would serve 60 customers in the absence of A, the estimated diversion from A to B equals 20% (=(60–50)/50, or 10 customers as a share of A's 50 total customers).

The diversion ratio above thus depends upon only two probabilities for each individual and service: $Pr_{i,k}(A)$ and $Pr_{i,k}(B)$. The conditional logit model, however, identifies the conditional probabilities $Pr_{i,k}(A|AorB)$ and $Pr_{i,k}(B|AorB)$. To estimate the diversion ratios, we would need additional assumptions to identify the unconditional probabilities (or, alternatively, $Pr_{i,k}(AorB)$).

Because we possess draw data for only customers who chose merging parties' hospitals, we cannot reliably observe the differentials in quality across veterinary hospitals that is embedded in $\alpha_{j,k}$ for third-party facilities. To estimate choice probabilities for non-merging hospitals, one potential assumption is that veterinary hospitals are differentiated only by physical location for a given service, which implies that $\alpha_{j,k}=\alpha_k$ for all j. These intercepts then drop out of Eq. (1), and the choice probabilities become purely a function of the disutility of travel and the distance that each consumer must travel to each hospital. These choice probabilities can then be used to estimate diversion ratios. We can test this assumption with the hospital-specific intercepts for the merging parties that are estimated from Eq. (1).

While a customer's experience at a veterinary hospital at one visit may influence the likelihood of visits for other services, we assume for simplicity that a customer's choice to visit a hospital for a given service is independent of the other services provided by that hospital. In essence, each service of the hospital is treated as a separate market. In practice, we examined both hospital-level and hospital-chain-level diversions: the latter indicates the extent to which a post-merger price increase at, or closure of, one veterinary hospital would benefit the merging partner across all of its veterinary hospital locations for a given service.

Although we lack reliable price data, we assume that veterinary hospitals compete in part on price. If the merger combines veterinary hospitals under common ownership that customers consider to be viable substitutes for a service k, the merger will eliminate price competition. Post-merger, the combined firm recognizes that any sales that are diverted from one location in response to a price increase or closure to a merging party location are now earned by the merged entity, reducing its previous incentive to compete for customers. The value of diverted sales can be thought of as the opportunity cost of price competition with its merging partner.

To gauge the combined veterinary hospital firm's incentives to increase prices at any given location for a service k, we can calculate the approximate predicted price increase using a generalized upward pricing pressure index ("GUPPI") in the vein

of, e.g., Jaffe and Weyl (2013). Specifically, we can calculate GUPPI in percentage terms for veterinary hospital firm A merging with firm B (A's hospitals are indexed by m and B's hospitals by n) as

$$\sum_m \sum_n \widehat{DR_{m \to n,,k}} \cdot \mu_{n,k} \cdot \left(p_{n,k}/p_{m,k}\right) \cdot Rev_{m,k},$$

where $\widehat{DR_{m \to n,,k}}$ denotes the estimated diversion from A's hospital m to B's hospital n, for service k; $\mu_{n,k}$ denotes the incremental margin that is earned by B's hospital n when rendering service k, as a percentage of price; $p_{m,k}$ and $p_{n,k}$ denote the firms' prices for service k at hospitals m and n; and $Rev_{m,k}$ the revenue share that is contributed by hospital m to B's total sales amongst competitive hospital locations.

To calculate GUPPI, we have to combine estimated diversions with estimates of the veterinary hospitals' incremental margins, the ratio of prices, and revenue shares across locations. Obtaining an economically meaningful measure of incremental margins can be challenging (Sacher & Simpson, 2020): one way to approximate incremental margins for emergency and specialty veterinary services is to calculate contribution margins from accounting data that were supplied by the merging parties for the veterinary hospitals in question. Conceptually, the contribution margin is the share of revenue remaining after variable costs have been covered. As was discussed above, we assume that for each set of hospitals m and n, $p_{n,k}/p_{m,k} = 1$.[12] Combining these assumptions, and further assuming a pass-through rate equal to "one" so that GUPPI equals the predicted price increase, yields estimates of the approximate predicted price increase at each of the merging party's veterinary hospitals for each service k.[13]

2.5 Discussion

This approach to merger analysis in veterinary hospital mergers is unique in two respects: first, that we possess unusually precise customer location data (i.e., customer address) for the merging parties' hospitals; and second, that we leverage these data to estimate competitive effects in the absence of a more universal customer dataset. Because we possess only the merging parties' customer data, from which we infer their choice dynamics, we rely extensively on the underlying assumptions of conditional logit to infer customer travel costs, and that of otherwise homogenous hospitals to estimate choice probabilities. From these assumptions, we estimate diversions between party hospitals and the upward pricing pressure and price effects that would result from their merger. We calculate these predicted price increases to evaluate whether the combination of a given set of the parties' veterinary hospitals would lead to a significant reduction in competition.

[12] This assumption could be adjusted accordingly if there were evidence of a price differential between hospitals.

[13] Academic studies, such as Miller et al. (2017), have shown that under certain, reasonable, demand forms, the pass-through rate is about "one"—which means that the GUPPI is a good approximation for the predicted price increase that would occur in the absence of any marginal cost efficiencies.

While in practice we describe very generally the geographies in which a proposed transaction raises competitive concerns—e.g., the San Francisco Bay Area—our approach to estimating competitive effects in these mergers does not require precise boundaries of geographic markets in which merger-related harm would occur. However, the estimated disutility of distance can help define geographic markets.

3 Rulemaking at the FTC

Historically, the FTC has primarily relied on its enforcement authority under Section 5 of the FTC Act to prevent deceptive and unfair acts and practices and unfair methods of competition. Section 13(b) of the FTC Act was interpreted to allow the FTC to return money to consumers that resulted from violations of the Section 5 standard, as well as for equitable relief such as a prohibition on misrepresentations or requirements to develop a data security program. In its 2021 decision in *AMG Capital Mgmt., LLC v. FTC*, however, the U.S. Supreme Court held that "Section 13(b) does not authorize the Commission to seek, or a court to award, equitable monetary relief such as restitution or disgorgement".[14] By removing the possibility of monetary relief, this decision has made it difficult for the FTC to deter deceptive and unfair conduct that violates Section 5 of the FTC Act.

However, in addition to its enforcement authority (which requires the FTC to bring lawsuits in court) under Section 5 of the FTC Act, the FTC has the authority to issue regulations to address unfair or deceptive practices that are prevalent or unfair methods of competition. The FTC uses rules to codify practices that are considered to be prohibited under the FTC Act and/or impose explicit requirements to accomplish a specific regulatory objective. Such regulations are legally binding on individuals and firms.

Rulemaking can enhance the deterrence of illegal conduct by allowing the FTC to obtain monetary redress for consumers from violations of rules. In addition, unlike the Section 5 standard, the FTC can obtain civil penalties from violations of rules. Not surprisingly, the FTC has signaled that it would exercise its rulemaking authority so as to allow for civil penalties to be sought against violators and to provide for greater ability to obtain redress and damages for consumers.[15]

In this section, we first discuss the tradeoffs of the FTC's promulgating rules compared to exercising its enforcement authority under Section 5 of the FTC Act through the lens of the "rules versus standards" debate of law and economics. We then detail the process of writing a rule and discuss the large number of rulemakings that are now underway at the FTC. We conclude by discussing the benefit–cost analysis of the notice of proposed rulemaking on non-compete agreements.

[14] *AMG Capital Mgmt., LLC v. FTC*, 141 S. Ct. 1341 (2021).

[15] See https://www.ftc.gov/system/files/documents/public_statements/1596664/agency_priorities_memo_from_chair_lina_m_khan_9-22-21.pdf.

3.1 Reasons for Rulemaking

A classic debate in both law and economics concerns the merits of rules versus standards (Ehrlich and Posner (1974), Kaplow (1992)). The tradeoffs with promulgating rules—as opposed to relying on the FTC's Section 5 enforcement authority—mirror the issues that are raised in this literature.

Kaplow (1992) defines the distinction between a rule and a standard as whether efforts to give content to the law occur before or after individuals act. Take, for example, highway safety: a standard might prohibit "driving at excessive speeds"; whether a driver is doing so might depend upon the weather, the condition of the road, the number of other drivers on the road, and the time of day. A judge would have to weigh these factors and others to decide whether a driver violated the law. A rule, on the other hand, might be a specific speed limit of 70 mph. To determine if someone violated the law by speeding, a judge would just need to see the reading of a speedometer (or a police radar gun): a factual finding. The driver, meanwhile, can look at her dashboard to know if she is violating the law.

Rules and standards lie on a continuum in their degree of specificity. In the consumer protection context, the FTC's Section 5 authority that prohibits deceptive and unfair practices would be considered a "standard" as defined by Kaplow (1992): It does not enumerate all of the various types of conduct that are deceptive or unfair. However, the FTC's policy statements that define deception and unfairness, its business guidance, and the case law from FTC enforcement actions all serve "to put meat on the bones" of the Section 5 standard.

Regulations will also vary in how much they resemble a "rule" as opposed to a "standard" in the rules versus standards debate. On the prescriptive end of the spectrum, the FTC's Funeral Rule requires funeral homes to provide a price list when a consumer asks for one, and the Rule details specific language that funeral homes must use in the price list and specific prices that they must itemize.[16]

The essence of the distinction between a rule and a standard is that a rule removes the uncertainty over what is illegal before the potentially illegal conduct occurs. By making it clear to market participants ex-ante what behavior violates the law and what the likely penalty for that activity is, rules can increase the probability that socially undesirable activity is punished, and so decrease the prevalence of such activity.

Another advantage of a rule is that it may be less costly for the legal system to determine whether a rule has been violated along several dimensions: first, the agency incurs costs while developing evidence of wrongdoing. For example, to use its Section 5 unfairness enforcement authority, the FTC has to show that: a firm's practices led to substantial injury to consumers; the practices were not reasonably avoidable by consumers; and the injury was not outweighed by countervailing

[16] See https://www.ftc.gov/system/files/ftc_gov/pdf/565A_Complying%20with%20Funeral%20Rule_2023_508.pdf for the FTC's guidance on complying with the Funeral Rule.

benefits to competition or consumers.[17] To enforce the Funeral Rule, on the other hand, the agency might need to show only that a funeral home refused to provide a price list, or that its price list did not conform to the rule's requirements. It does not have to show any injury to consumers to prove liability.[18]

In the above example, the rule made it easier for the agency to show liability. In other cases, a rule could make it easier for a firm to establish a defense or could make it difficult for the agency to prove liability. The costs of developing evidence for both parties in a case will depend upon what conduct the rule makes illegal.

In addition, going to trial based on the FTC's enforcement authority can be quite costly. If rules make it easier to prove liability from socially undesirable activity, it may take less time and effort for a judge to decide a case. Parties may be more likely to settle out of court quickly if the decision that the court would make is more predictable.[19]

Finally, case law from enforcement actions serve to flesh out the legal content of a standard. A specialist agency may develop better law through rulemakings than the decisions of generalist judges in specific enforcement actions; rules can bind the courts and thereby prevent bad precedents. In addition, such case law, and so the requirements that firms have to abide by, necessarily comes after firms have acted rather than before.

However, rulemaking also imposes costs. First, it is costly for regulatory agencies to promulgate rules. In the next subsection, we discuss the multi-step "notice and comment" process that is required to write rules. Second, the rule could impose direct costs on businesses such as developing and maintaining otherwise unnecessary business records, as well as other compliance costs such as hiring lawyers to provide legal advice about how to follow the rule.

However, firms also pay compliance costs to meet the requirements of a standard. Kaplow (1992) argues that it is ambiguous as to whether a rule or a standard leads to greater compliance costs—depending on whether and how firms choose to become informed of their obligations under each policy. For example, a rule could reduce costs to firms by making clear what the right thing to do is; absent the rule, each firm might spend costly effort to predict what conduct complies with the standard. They may also incorrectly predict how the agency will interpret the standard. A rule might be costlier than a standard when firms believe that it is too costly to learn how to comply with the law, and so do nothing.

[17] See the FTC's policy statement on unfair acts and practices, available here: https://www.ftc.gov/legal-library/browse/ftc-policy-statement-unfairness.

[18] The FTC regularly conducts undercover operations to detect funeral homes that do not abide by the rule. Violators can enter the Funeral Rule Offenders Program run by the National Funeral Directors Association in lieu of a potential FTC lawsuit. It provides participants with a legal review of the price disclosures that are required by the Funeral Rule, and on-going training, testing, and monitoring for compliance with the Rule. In addition, funeral homes that participate in the program make a voluntary payment to the U.S. Treasury in place of a civil penalty and pay annual administrative fees to the Association. See https://www.ftc.gov/news-events/news/press-releases/2010/03/undercover-inspections-funeral-homes-nine-states-washington-dc-press-funeral-homes-comply-consumer.

[19] However, if actors are risk averse, the uncertainty that occurs in the absence of rules may increase the likelihood of settlement.

When might a rule be preferable to a standard? If an unfair or deceptive practice is common across firms in an industry, it could be quite costly for an agency to bring enforcement actions against every firm with the practice. The largest cost of developing the rule might be incurred only once and might quickly change firm behavior for the reasons that were laid out above. A rule also ensures consistent application of the law, as firms with the same practices would be treated the same. For example, a rule could require all firms to disclose better information on a product—whereas enforcement actions would directly affect only the firms that the FTC has sued. Finally, if complying with the law puts a firm at a competitive disadvantage, enforcement actions against a single firm could simply benefit competitors who are also not in compliance with the law (but who are not the target of the enforcement action).

On the other hand, depending on the potential harm that is being addressed, it might be difficult to justify rules to cover conduct that is relatively rare, or that varies substantially in characteristics across firms. In innovative industries, prescriptive rules could quickly become out of date due to changes in technology. Finally, firms might learn how to evade a rule by developing new business models that the rule does not address, but could still be covered under the standard.

Rules can be both overinclusive—prohibiting conduct that might be socially desirable—sand underinclusive—allowing socially undesirable conduct—compared to standards that are set in broad statutory authority language. For the issue of overinclusion, an enforcement agency has discretion on how to enforce the rule and can use its discretion to allow socially desirable conduct. For example, a police officer might not give a speeding ticket to a driver with a medical emergency who is driving above the speed limit to get to a hospital. Overinclusive rules could still deter desirable conduct—depending on what firms believe that the agency will do.

The development of the Internet provides a case study of how rules can be underinclusive: it took time for the FTC to learn about persistent problems in new online markets and for Congress to pass laws to address these problems. For example, Congress passed the Children's Online Privacy Protection Act (COPPA) in 1998, at the end of the dot-com boom, and the FTC published the rules that the COPPA required in 2000. The Health Breach Notification Rule—on data breaches that occur in health care markets—was published in 2009. Through the FTC rule review process, these rulemakings have been amended or are under review for potential modifications to address changes in technology since they were initially published. The Section 5 standard, however, applied to online conduct from the beginning of the Internet. It equally applies to new AI technologies that are being developed today.[20] Broad standards can thus complement more specific rules.[21]

[20] As FTC Chair Lina Khan states, "Although these tools [AI] are novel, they are not exempt from existing rules, and the F.T.C. will vigorously enforce the laws we are charged with administering, even in this new market." See https://www.nytimes.com/2023/05/03/opinion/ai-lina-khan-ftc-technology.html?te=1&nl=dealbook&emc=edit_dk_20230516.

[21] However, firms still must predict accurately the requirements of the standard ex-ante for the standard to deter undesirable conduct, and the agency may have to bring enforcement actions quickly against firms that violate the standard.

3.2 The Process of Rulemaking

Diver (1983) identifies three desired features for legal rules: The first—transparency—is that it is clear what the rule means. The second criterion—accessibility—is that the rule can be applied to a situation without undue effort. The third criterion—congruence—is that the rule achieves the outcome that is desired by the policymaker: such as prohibiting only socially undesirable behavior. In practice, writing rules requires complex trade-offs amongst these objectives. For example, a more detailed, prescriptive set of rules might be transparent—every lawyer agrees on the meaning of each rule—but not accessible: a business must hire a lawyer to provide guidance on how to act given the rules.

How do policymakers ensure that they reach the right tradeoffs when writing a rule? The federal government follows a multi-step "notice and comment" process that iterates between agency action and public comment. This process provides information to the public on what the agency is considering and information to the agency on what the public is concerned about. It informs both the public and policymakers on the potential costs and benefits of a rule. Finally, the process provides "error correction", as public commenters can point out flaws in the agency's reasoning and suggest alternate rules.[22]

The first step in this process is that the FTC may—and in some cases must—gather information and increase public participation through an "advance notice of proposed rulemaking" (ANPRM) in the Federal Register before developing a proposed rule. The ANPRM gives interested parties an opportunity to submit comments on their perspectives on whether a rule is needed and their concerns, and any supporting data so that the agency can consider the comments and/or data as part of the rulemaking record in developing the draft proposal.

Second, the agency publishes a general "notice of proposed rulemaking" (NPRM) in the Federal Register. The NPRM explains an agency's statutory authority for rulemaking, summarizes the issues that the agency seeks to address and why a rule is necessary, and provides the details of its proposed rule, in addition to the language for the amendments to the standing body of law in the Code of Federal Regulations. The NPRM also invites the public to provide comments, supporting evidence, and data so as to inform the rulemaking.

A key feature of many federal rulemakings is the requirement for agencies to consider both the costs and the benefits of the rule before implementing new regulatory actions and to make that underlying analysis public. Rules that have "an annual effect on the national economy of $100,000,000 or more" should include a regulatory analysis that projects benefits and any adverse economic effects or consequences, as well as that of any alternative approaches.[23]This analysis—which is also commonly known as a "regulatory impact analysis" (RIA)—is made available for public review and comment. For example, comments from academic economists

[22] Diver (1983) discusses further issues when rulemaking is done by ordinary humans as opposed to a perfectly rational social planner.

[23] 15 U.S.C. § 57b-3.

could show how to quantify specific benefits or costs of the rule, conduct surveys to quantify these benefits or costs, identify and summarize the relevant research papers, or point out additional theoretical justifications for a rule.

In the Appendix, we provide an overview of the steps that are involved in developing a regulatory analysis of a rule, as is detailed in the Office of Management and Budget's (OMB's) primary guidance for federal agencies in developing regulatory impact analyses.[24] The general process for developing the regulatory analysis includes: developing a detailed description and analysis of the need for the regulatory action and an explanation of how the proposed action would address the underlying problem; developing the baseline against which effects are measured; identifying potential regulatory alternatives; analyzing the expected benefits and costs of the proposed regulatory action, as well as each of the alternatives that have been identified; and summarizing the findings of the regulatory analysis.

The regulatory impact analysis in rulemaking is akin to a total welfare standard in that transfers between economic agents do not count as benefits or affect social welfare.[25] Take, for example, a rule that provides better information on products to consumers, and so reduces search frictions and increases competition amongst sellers: the reduced search costs to consumers or reduced deadweight loss from increased output would count as benefits under the rule. Lower prices to inframarginal consumers (since that would involve a transfer from sellers) would not. In contrast, evidence that a merger would increase prices to consumers or reduce wages to workers might prompt an agency to block the merger without having to show that these effects outweigh increased profits to the merging firms.

At the final step, the agency publishes a final rule notice. The final rule is structured similarly to the NPRM, except that it also includes the agency's summary and assessment of the significant issues that have been raised by public comments in response to the NPRM and a final regulatory analysis.

Economic and technological change mean that rules may have to adjust to changing circumstances. To make its rules dynamic, the FTC typically conducts rule reviews every 10 years. For example, the FTC promulgated the Funeral Rule that requires funeral homes to disclose price lists in 1982, before the existence of the Internet. In a recent rule review, it has asked for public comment on amending the rule so as to require funeral homes to place price lists online.

[24] This guidance is provided in OMB's Circular A-4, https://www.whitehouse.gov/wp-content/uploads/2023/11/CircularA-4.pdf.

[25] Before the revisions, Circular A-4 stated that "You should report transfers separately and avoid the misclassification of transfer payments as benefits or costs. Transfers occur when wealth or income is redistributed without any direct change in aggregate social welfare." After the recent revisions, Circular A-4 states that "A transfer payment, in its simplest form, is a shift in money (or other item of value) from one party to another. More generally, when a regulation generates a gain for one group and an equal-dollar-value loss for another group, the regulation is said to cause a transfer from the latter group to the former." The recent revisions to Circular A-4 stress examining distributional effects of rules; see Section 9 and 10 of Circular A-4 for a discussion of transfers and distributional effects.

Table 1 Select Recent FTC Rulemakings

Rule	Year/status[a]	Description of proposed rule (NPRM) or topic of rule (ANPRM)
New rulemakings		
Deceptive or unfair earnings claims	2022; ANPRM	Deceptive or unfair marketing using earnings claims
Rule on commercial surveillance and data security	2022; ANPRM	Protection of people's privacy and information in the commercial surveillance economy
Rule on impersonation of government and businesses	2022; NPRM	Prohibit the impersonation of government, businesses, or their officials
Unfair or deceptive fees rule	2023; NPRM	Prohibit hidden and falsely advertised fees (i.e., Junk Fees)
Motor vehicle dealers rule	2022; NPRM	Ban junk fees and bait-and-switch advertising tactics at auto dealers
Rule on the use of reviews and endorsements	2022; NPRM	Prohibit illicit review and endorsement practices such as using fake reviews, suppressing honest negative reviews, and paying for positive reviews
Non-compete clause rule	2023; NPRM	Prevent employers from entering into non-compete clauses with workers and require employers to rescind existing non-compete clauses
Rule reviews		
Negative option rule	1973; NPRM	Require "click to cancel" provision requiring sellers to make it as easy for consumers to cancel their enrollment as it was to sign up
Amplifier rule	1974; NPRM	Requires sellers to use uniform testing methods when advertising power output levels
Eyeglass rule	1978; NPRM	Require that prescribers obtain and maintain a signed confirmation after releasing a prescription to a patient
Business opportunity rule	1978/2012; ANPRM[b]	Extend Rule to include business coaching and work-from-home programs, investment coaching programs, and e-commerce opportunities
Energy labeling rule	1979; ANPRM	Modernize and expand the Rule's coverage to reduce energy costs for consumers and require manufacturers to provide consumers with repair instructions
Funeral rule	1982; ANPRM	Require funeral providers to display or distribute their price information online and through electronic means
Health breach notification rule	2009; NPRM	Clarify that Rule applies to health apps

[a]For regulatory actions that are "rule reviews" or amendments of existing rules, the year reflects the date of original publication of the rule. Otherwise, the year reflects the date of publication corresponding to the most recent published regulatory action

[b]The rule entitled "Disclosure Requirements and Prohibitions Concerning Franchising and Business Opportunity Ventures", promulgated in 1978, covered both franchises and certain business opportunity ventures under in a single CFR part. The FTC bifurcated this original rule into a Franchise Rule and Interim Business Opportunity Rule in 2007; a Revised Business Opportunity Rule took effect in 2012

3.3 Current Rulemaking Activity at the FTC

In Spring 2023, 22 rulemakings were in development at the FTC.[26] These rulemakings included modifications of existing rules as well as new rulemaking activity.[27]

Table 1 displays a select, recent portfolio of new rulemakings and rule reviews that BE staff have been involved in developing. The table includes the year of initial publication, the current status of the rulemaking, as well as either the description of proposed rules that are at the NPRM stage or are the topic of rulemakings at the ANPRM stage. For rule reviews that discuss many topics or changes, we describe only one major potential change.

Table 1 reveals four broad eras of rulemaking at the FTC: first, while the FTC had enacted industry-specific interpretive or advisory rules since its inception, it began writing legally binding regulations only in the 1960s. The FTC adopted more than 20 such regulations between 1963 and 1975 under the Administrative Procedures Act (APA), which governs most rulemaking in the federal government. In 1975, Congress passed the Magnuson-Moss Warranty—FTC Improvement Act, which granted the FTC new rulemaking authority for consumer protection but required more complex procedures than APA rulemaking. Many rulemakings were initiated under the Magnuson-Moss Act soon after its passage, but only five were promulgated in final form. In the 1980s through 2010s, most rules that were promulgated by the FTC were required by laws that were passed by Congress that allowed APA procedures for the rulemaking.[28] Finally, the FTC has begun a new era of rulemaking in the past two years with several ongoing new rulemakings.

The rulemakings in Table 1 encompass a variety of topics, including impersonation and business opportunity scams, fake reviews and endorsements, and negative option subscriptions, as well as industries as diverse as funeral homes, amplifier manufacturers, optometry practices, and auto dealers. Many rules respond to broader technological changes, such as potentially requiring price lists to be available online, clarifying that a rule applies to health apps, and protecting consumers' privacy and data in the modern surveillance economy.

While almost all the rulemakings in Table 1 concern consumer protection, the FTC has recently begun a rulemaking on non-compete agreements, which would be its first rulemaking based on its unfair methods of competition authority since 1968 (Chopra & Khan, 2020). In the following subsection, we provide additional background and economic analysis for this rule.

[26] Here, we rely on the Unified Agenda of Federal Regulatory and Deregulatory Actions: This is a semi-annual resource for the public to preview all federal rulemakings anticipated to occur within a 12-month time frame or beyond if they are listed as long-term actions. Our count excludes the annual "Regulatory Review" notification listing. The current Unified Agenda is available at: https://www.reginfo.gov/public/do/eAgendaMain.

[27] Reviews or modifications of existing rules are conducted as part of the FTC's ongoing 10-year review program that is modelled after provisions in the Regulatory Flexibility Act, 5 U.S.C. 601–612 in compliance with the Small Business Regulatory Enforcement Fairness Act of 1996.

[28] See Parnes and Jennings (1997) and Lubbers (2014) for more on the history of FTC rulemaking.

3.4 Non-compete Clause Rulemaking

On January 5, 2023, the FTC announced a Notice of Proposed Rulemaking (NPRM) to prohibit most non-compete clauses for workers. Non-competes are clauses in contracts between employers and workers that prohibit the worker from joining or forming a competing firm after her job ends. The NPRM outlines the legal and economic justifications for the proposed rule, and its issuance opened a comment period that is intended to allow the public to weigh in on those justifications (as well as the proposed rule itself). After reviewing the comments, the FTC will determine whether a final rule will be published and, if so, whether modifications should be made to the rule that has been proposed in the NPRM.

Crafting the NPRM required substantial consideration of the extensive economic literature on non-competes, which has touched on topics such as worker outcomes,[29] entrepreneurship,[30] and innovation.[31] Ultimately, the goal of the analysis of benefits and costs in the NPRM was to calculate the net effects that a prohibition on non-competes would have on the economy. We preliminarily found that non-competes harm labor markets and product and service markets, and we quantified and monetized—to the extent we were able—the benefits and costs that are associated with the enforceability of non-competes.

Evidence shows that workers' earnings suffer when non-competes are easier for firms to enforce, even for workers who are not themselves bound by non-competes (Johnson et al., 2021). To estimate the total impact of the proposed ban on workers' earnings, we used the two estimates from the economic literature that apply to the broadest swathes of the workforce:

First, with the use of staggered changes in the state-level laws that govern non-compete enforceability, Johnson et al. (2021) find that moving to a policy of non-enforcement of non-competes (which is akin to the proposed rule) would increase annual nationwide earnings by 3.3–13.9%. Conservatively using the lower bound of 3.3%, we applied this estimate to national private-sector earnings data from the Bureau of Labor Statistics to arrive at one of our estimates: Finalizing the proposed rule would increase earnings by 3.3% * $7577.3 billion = $250 billion.[32]

Second, Starr (2019) compares workers in occupations that use non-competes at a high rate to workers in occupations that use non-competes at a low rate, combined with cross-sectional differences in non-compete enforceability. He estimates that a one standard deviation decrease in non-compete enforceability (using a common index of enforceability—the non-compete enforceability score—for which higher values represent states in which courts more readily enforce non-competes) increases worker earnings by approximately 1%.

[29] See, e.g., Lipsitz and Starr (2022), Starr (2019), and Johnson and Lipsitz (2022).

[30] See, e.g., Lipsitz and Tremblay (2022) and Starr et al. (2018).

[31] See, e.g., Johnson et al. (2023) and Baslandze (2022).

[32] National annual earnings of $7577.3 billion are taken from Bureau of Labor Statistics, Employment and Wages Data Viewer (last visited Dec. 9, 2022), available at https://data.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables. The calculation used data from private employers in 2020 (the most recent year with finalized numbers at the time of calculation).

We calculated the size of the decrease of the enforceability score in each state that would result from the proposed rule and combined that decrease with the estimate from Starr (2019) and state-level earnings data according to the following formula:

$$\sum_s [Earnings_s * (e^{-0.0099*(Score_s - MinScore)} - 1)],$$

where s indexes states; $Earnings_s$ represents state-level earnings from private employers in 2020 for state s; $Score_s$ represents the non-compete enforceability score for state s in 2014 (the most recent year with available data); *MinScore* represents the minimum observed score (corresponding to North Dakota, which statutorily prohibits non-competes, akin to the proposed rule); and -0.0099 is the coefficient on log(earnings) from Starr (2019). With the use of this formula, we arrived at the second estimate: finalizing the proposed rule would increase earnings by $296 billion. It is important to note that both estimates represent the benefits for workers, not *net* economic benefits. Some portion of the increase in worker earnings may represent transfers between workers and firms, which are distinct from net economic benefits in regulatory impact analyses.

On the product market side, quantification of benefits was more difficult—though the literature broadly agrees that non-competes hinder entrepreneurship. Since the literature on non-competes and entrepreneurship has not used a quantified scale of non-compete enforceability (and instead relies on discrete natural experiments or comparisons to appropriate control groups), extrapolation to the effect of the proposed rule was not straightforward. Similarly, the literature finds that non-competes increase concentration (broadly) and prices (in the healthcare sector), and generally (though not exclusively) finds that non-competes hinder innovation. Once again, however, the construction of the estimates in the literature made it difficult to monetize the effect of the rule, with one exception: Linearly extrapolating the impact of non-compete enforceability on prices at physician practices, we found that healthcare spending would decrease by about $148 billion due to the proposed rule. Similar to the impact on earnings, some portion of this represents a transfer from physicians to patients.

Some of the costs of the proposed rule were more straightforward to monetize: Firms would face direct compliance costs—the rescission of non-competes from existing contracts and the removal of non-competes from new contracts—and may face costs that are related to updating their contractual practices: for example, implementing contractual provisions to protect trade secrets. Making assumptions on time usage and using available information on wage rates of attorneys and human resource specialists, the count of firms, and estimates of the proportion of firms that use non-competes, we estimated that direct compliance costs will total approximately $281 million, and the cost for firms to update their contractual practices would be approximately $742 million to $1.48 billion.

Another major cost that is discussed in the NPRM is the potential cost of lost investment. The economic literature finds that non-compete enforceability increases capital investment and worker training, and the economic benefits of those investments would be lost under the proposed rule. Like many of the benefits that were noted above, we were unable to quantify the size of this cost under the proposed rule.

One exercise that we performed, given the inability to quantify several benefits and costs, was to ask: what percentage of the earnings increase for workers must represent a net benefit (due to, for example, more productive matching under the proposed rule as compared with the status quo), as opposed to a transfer, so as to cover economic costs of varying sizes? In performing this calculation, we ignored all of the potential benefits that would stem from increases in entrepreneurship and innovation or reductions in concentration and focused solely on labor market benefits.

We found that to cover the compliance costs and the costs of updating contractual practices, 0.08% of the earnings increase (which is assumed to occur annually for 10 years at an annual discount rate of 7%)[33] would need to represent a net benefit. To cover substantially larger costs, the percentage would need to be proportionally larger: up to 2.85% of the discounted future stream of earnings increases to cover a ten year total net economic cost of $50 billion.

The public submitted over 20,000 comments on the proposed rule. While analysis of those comments is ongoing, it is our hope that the comments will allow us to sharpen our analysis of the benefits and costs of the proposed rule. We are also working to understand the concerns of commenters as well as new studies that have come out since the publication of the NPRM. Indeed, in extending the comment period, we specifically requested comment on a new study (Hiraiwa et al., 2023) which finds that firms do not value legal enforceability of non-competes for certain workers. Additional information, whether from economists, other scholars, business owners, or the rest of the public, helps contribute to an analysis of the rule which is as complete and rich as possible.

4 Conclusion

In this article, we first described work done by economists at the Federal Trade Commission on spatial markets, including developing new demand models, evaluating the predictive performance of those models, assessing the mechanisms through which important predictors such as distance or switching costs affect demand, and evaluating how merger effects vary spatially. We then examined an application to mergers in veterinary markets; we showed how to construct proxies of merger harm—such as diversion ratios and Upward Pricing Pressure—when the FTC has detailed demand data on only customers of the merging parties.

Next, we examined rulemaking, as the FTC is now developing several new rules to address both competition and consumer protection concerns across many different sectors of the economy. We first discussed the benefits and costs of rulemaking compared to relying on the FTC's Section 5 standard prohibiting deceptive and unfair acts and practices, and demonstrated how this discussion relates to a longstanding

[33] The discount rate is the more conservative of the two options recommended in the previous version of Circular A-4, the Office of Management and Budget's guidelines for regulatory impact analysis. The time horizon was selected to encompass a reasonable timeframe during which costs and benefits may persist, while still considering a timeframe during which the agency can reasonably make predictions. See the Appendix for more details on discounting benefits and costs in regulatory analysis.

debate in law and economics on rules vs. standards. We then described the process of rulemaking and developing the Regulatory Impact Analysis detailing the costs and benefits of a rule. We next detailed several new rulemakings in progress at the FTC. Finally, we conclude with a discussion of the Regulatory Impact Analysis of a proposed rule banning most non-compete clauses in employment contracts.

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A Appendix: Rulemaking Details

A.1 Elements of the Rulemaking Process

Most federal rulemakings, including certain types of FTC rulemakings, are governed by the notice-and-comment process under the Administrative Procedures Act (APA). Under the APA, rulemakings usually begin with a general "notice of proposed rulemaking" (NPRM), or "proposed rule", which is published in the Federal Register so as to let the public know that it plans to commence rulemaking. The preamble of the proposed rule: explains an agency's statutory authority for rulemaking; summarizes the issues that it seeks to address and why a rule is necessary; and provides the details of its proposal. The NPRM also includes the proposed "regulatory text", which sets out the amendments to the standing body of law in the Code of Federal Regulations. The NPRM also invites the public to provide comments, supporting evidence, and data to inform the rulemaking.

A key feature of many federal rulemakings is the requirement for agencies to consider both costs and benefits of the rule before implementing new regulatory actions and to make that underlying analysis public. If a rule is determined to be

a "significant regulatory action", the executive branch or cabinet-level departments and agencies are required to submit their rulemaking along with its assessment and underlying analysis of costs and benefits for review by the Office of Management and Budget.[34] While "independent" agencies, such as the FTC, are not subject to the same review and analytical requirements as are agencies that are within the executive branch of the federal government, the rulemaking provisions that are covered by the FTC Act embed analytical requirements into its own rulemaking procedures.[35] Accordingly, rules that have "an annual effect on the national economy of $100,000,000 or more" should include a regulatory analysis that projects benefits and any adverse economic effects or consequences, as well as that of any alternative approaches.[36]

The purpose of a regulatory analysis is to inform the development and design of the regulation with consideration of social benefits and social costs and for transparency to the public of the likely effects of the proposal. A prospective cost–benefit analysis provides a systematic approach for comparing benefits and costs of a policy intervention and uses techniques and methods from economics and statistics to predict the impacts of the rule—including any unintended consequences. The economic analysis (which is also commonly known as a "regulatory impact analysis" or RIA) of the proposed rule is made available for public review and comment. It is usually either found in a section of the preamble or referenced as a standalone document that is included in the public docket for the rulemaking.[37]

Before issuing a proposed rule, an agency may also gather information and increase public participation through an "advance notice of proposed rulemaking" (ANPRM) in the Federal Register as a preliminary step. This may be done to engage industry, consumer groups, and any other interested parties in a public dialogue on specific needs for a rulemaking or to gather additional data, when it is not yet clear what should be proposed. Any interested individual or group may submit: comments on their perspectives on whether a rule is needed; their concerns; and any supporting data so that the agency can consider these comments as part of the rulemaking record in developing the draft proposal.

Under informal rulemaking procedures under the APA, which applies to rules that address "unfair methods of competition", it would not be necessary to issue an ANPRM prior to an NPRM; however, under the Magnuson-Moss Warranty—Federal Trade Commission Improvement Act of 1975, Congress imposed more

[34] See Section 3(f)(1)–(4) for the definition of a "significant regulatory action" in Executive Order 12866, issued September 30, 1993, available at https://www.reginfo.gov/public/jsp/Utilities/EO_12866.pdf, as amended by the April 6, 2023 Executive Order on "Modernizing Regulatory Review", available at: https://www.whitehouse.gov/briefing-room/presidential-actions/2023/04/06/executive-order-on-modernizing-regulatory-review/. On January 21, 2011, Executive Order 13,563, available at https://www.reginfo.gov/public/jsp/Utilities/EO_13563.pdf, reaffirmed the principles in E.O. 12866. The list of Executive Departments can be found in 5 U.S.C. § 101.

[35] See Section 22 of the FTC Act, which applies to all FTC rules that are promulgated under Sections 6 or 18 of the FTC Act, except for those "involving Commission management or personnel, general statements of policy, or rules relating to Commission organization, procedure, or practice".

[36] 15 U.S.C. § 57b-3.

[37] Available at https://www.regulations.gov/.

stringent rulemaking procedures for rules that address "unfair and deceptive practices" as described in Section 18 of the FTC Act.[38] With "Section 18 rulemakings" or "trade regulation rules" that address "unfair or deceptive" practices, the FTC must issue an ANPRM and take additional steps under the Magnuson-Moss rulemaking procedures.[39]

For these rules, the FTC must publish an ANPRM before publishing the NPRM, as well as provide an opportunity for an informal hearing after publishing the proposed rule. The ANPRM engages the public early in the process before the agency has reached its tentative conclusion on the proposal and usually includes a series of open-ended questions to which the public may respond. Those comments are reviewed and considered through the process of developing specific provisions of the proposal and may inform development of the preliminary regulatory impact analysis for the proposed rule.

Comments that are filed during the open comment period, data, and other evidence that is collected during the ANPRM and NPRM stages contribute to the "rulemaking record", which forms the basis for the agency's reasoned decision-making for a final rule that would then become legally binding upon its effective date. A published final rule notice is structured similarly to the NPRM—except that it also includes the agency's summary and assessment of the significant issues that were raised by public comments in response to the NPRM and a final regulatory analysis. The final rule may differ from the proposed rule so long as it is a "logical outgrowth" of the approach discussed in the NPRM.

As with the ANPRM stage, public comments and data that are submitted during the public comment period for the proposed rule can be useful for filling in data gaps and informing the final regulatory impact analysis. Therefore, the changes that are made between the proposed rule and the final rule that are based on consideration of public comments may also result in corresponding changes to the economic analysis of the final rule.

A.2 Economic Analysis of Rulemakings

The text described five key components to the economic analysis of rulemakings. These components are discussed in more detail below:

A.2.1 Identifying the Need for Federal Regulatory Action

A regulatory impact analysis usually begins with a section that characterizes the nature of the underlying problem that the rule addresses and an economic rationale for why a regulatory intervention would be necessary. An economic framing of the problem involves describing any market failures—such as an externality, public

[38] See https://www.congress.gov/93/statute/STATUTE-88/STATUTE-88-Pg2183.pdf.

[39] 15 U.S.C. 57a(a)(1)(B).

goods, market power, or inadequate or asymmetric information—and the degree to which the regulatory action may correct such distortions. The recent revisions to Circular A-4 (this document is referenced in the main body of the text above) go beyond the list of traditional sources of market failures: for example, to include behavioral biases—where there may be limitations in information processing and systematic decision-making biases—and other social purposes, such as equity and fairness considerations.

The purpose of the "need for regulation" discussion is to develop the theoretical and conceptual framework as a starting point for further examination of the evidence, data, and empirical literature on the magnitude of the problem and to determine the linkage between the proposed regulation and its potential effects. While there may be other reasons for requiring a regulatory action that are discussed in the preamble of a rule—such as a statutory mandate or other legal purposes—they may be less informative for grounding the economic analysis and identifying potential sources for welfare gains.

A.2.2 Defining the Analytical Baseline

All costs, benefits, and transfers of a rule are measured against a baseline that represents the future state of the world in the absence of the rule; this is sometimes referred to as the "no action baseline". While the status quo or current conditions are used as a proxy to forecast the future, the baseline is dynamic and should ideally account for any market trends, technological advancements, and other changes that would have occurred in the counterfactual. Selecting a time horizon for the analysis should balance the length of time that is needed to capture the effects of the rule with the ability to forecast accurately the future baseline as uncertainty grows with a longer time horizon. Circular A-4 doesn't prescribe a specific time horizon for regulatory analyses but recommends that it should be long enough to encompass most of the important effects—this would mean 10–20 years for most rules that have more immediate effects.

The baseline usually includes estimates (over the period of analysis) of: the number of regulated entities and industries that would be affected; the size of the market that would be affected; and the number of individuals that would be affected. To the extent that more granular data are available, disaggregating by subgroups and categories can be useful for refining the scope of the rule and identifying potential alternatives. If the rule addresses specific adverse outcomes, the analysis should provide evidence about those baseline risks and quantify them to the extent possible. To lay the groundwork for estimating benefits, it is important to define the baseline for any relevant endpoints, measures, and outcomes that will be used to characterize the effectiveness of a rule.

Another consideration for the baseline is the degree to which regulated entities may already comply through state and local rules, international standards and regulations, current industry best practices, or other market pressures. Since the goal of a regulatory analysis is to estimate the incremental effects that are attributable to the rule, any voluntary compliance—if independent of the rule,—should be reflected as

part of the baseline rather than counted as an incremental effect (costs, benefits, and transfers) that is attributable to the rule. When the timing of voluntary compliance overlaps with announced plans for a potential rulemaking or when there has been a substantial amount of public discourse about a forthcoming policy, it can be challenging to distinguish movement towards compliance that is due to anticipation of the rulemaking—in which case corresponding costs and benefits should be attributable to the rule—from compliance that would have occurred in the absence of a rule.

The preamble to the proposed revisions to and the updated Circular A-4 highlight some of these issues and suggest that when there is uncertainty about the correct baseline, the effects could be assessed against multiple baselines so as to determine the sensitivity of the results.[40]

A.2.3 Identifying Regulatory Approaches

In considering potential regulatory alternatives, the initial baseline analysis sets the foundation for assessing how variations and altering parameters of the rule will affect benefits and costs. Feasible regulatory alternatives should consider different ways to achieve the regulatory objectives with the least amount of burden and unintended consequences. Recognizing the practical limitations on the number of alternatives that can be realistically assessed, Circular A-4 recommends assessing at least one option that is more stringent and one that is less stringent as compared with the preferred option.

If there are multiple distinct provisions or requirements within a rule, ideally the analysis would assess the costs and benefits that are attributable to each discrete provision. A provision-by-provision analysis of the incremental costs and benefits would facilitate a comparison of alternatives in determining which subset of provisions may be the most net beneficial. In some circumstances, the costs and benefits of individual provisions may not be distinguishable from that of others or only partially separable. It is also useful to analyze the rule's effects according to its key provisions so as to show how the costs, benefits, and transfers of the rule would change if any were to be eliminated. With the goal of helping agencies identify potential regulatory alternatives that may maximize net benefits, Circular A-4 describes the following approaches and dimensions of a rule that could be varied to reduce burden:

- Market-oriented approaches and direct controls
- Performance standards and design standards
- Informational measures and nudges
- Different choices defined or identified by statute
- Different methods to ensure compliance
- Different degrees of stringency
- Different compliance dates
- Pilot projects, data collection, and learning through variation
- Requirements that are based on geographic regions

[40] Available at: https://www.whitehouse.gov/wp-content/uploads/2023/04/DraftCircularA-4Preamble.pdf.

A.2.4 Measuring Benefits, Costs, and Transfers of the Rule and Alternatives

The regulatory analysis should describe anticipated incremental benefits, costs, and transfers that are associated with the preferred regulatory option and any reasonable alternatives. Estimating costs, benefits, and transfers involves predicting the behavioral changes that are likely to arise as a consequence of a rule's requirements and valuing those changes. The analysis should consider direct compliance costs as well as any important indirect costs that are attributable to the rule, such as any adverse or countervailing effects that are not captured in the direct costs. Benefits of a rule are usually favorable effects that correspond with the overall objectives of the rule. For example, a rule that addresses information asymmetry may result in benefits that include reduced consumer search cost and welfare gains that arise from eliminating any distortions in equilibrium pricing.

Benefits and costs should reflect changes in real resource use, whereas transfers reflect effects on one group that are offset by its opposite effects on another group and do not affect net gains in social welfare. While a transfer is not counted as a net cost or benefit, the regulatory analysis should provide a separate description of the distributional effects to show whose losses may be offset by another group's gains, as well as the incidence of costs and benefits since those who bear the costs may be different than the ones accruing the benefits.

The analysis should capture all important practical effects and consequences of the rule. Circular A-4 recommends that the analysis present separate schedules of monetized benefits, costs, and transfers to show the type and timing of undiscounted impacts. Benefits, costs, and transfers should be quantified and monetized to the extent possible. The analysis should also identify benefits and costs that can be quantified, but not monetized, including their timing. Circular A-4 recommends presenting "benefits and costs in physical units in addition to monetary units" for transparency of the analysis. For benefits and costs that cannot be quantified, the analysis should provide a qualitative description of those effects and explain why they cannot be quantified.

The following are examples of effects that should be considered, quantified, and monetized where possible:

- Private sector, including industry, compliance costs and savings
- Government administrative costs and savings
- Gains or losses in consumers' or producers' surpluses
- Discomfort or inconvenience benefits and costs
- Gains or losses of the opportunity cost of time such as work or leisure

To account for differences in the timing of the effects, the costs, benefits, and transfers are normalized across multiple time periods with the use of "discount rates" and expressed as "discounted present values" and "annualized values". The current Circular A-4 guidance, published on November 9, 2023, recommends using a default discount rate of 2 percent, which reflects the real rate of return on long-term government debt over the last thirty years as a measure of the "social rate of time preference" (SRTP)-the rate at which society is willing to trade current consumption

for future consumption. OMB indicates that they plan to publish updates to this estimate every three years in the Appendix to Circular A-4.

If there is substantial displacement of capital anticipated, Circular A-4 recommends using a "shadow price of capital" approach to generate consumption-equivalent effects before discounting. As a default, the guidance recommends applying 1 as a lower value and 1.2 as a high value.[41]

The prospective nature of regulatory analyses makes it particularly challenging to quantify and monetize the anticipated consequences of a rule. The analysis should rely on "the best reasonably obtainable scientific, technical, economic, and other information to quantify the likely benefits and costs of each regulatory alternative."[42] Data sources for the analysis may be publicly available or from confidential agency or proprietary data sources with the appropriate level of aggregation. While primary research and pilot studies that are specific to the rule's context would be most informative for predicting the effects of a rule, usually time and resource constraints necessitate relying on existing studies and benefit-transfer methods for key parameters and values for the analysis.

Interrelationships between key parameters to develop estimates of costs and benefits may also involve making reasonable assumptions when there is a lack of data or when extrapolations from similar contexts are needed. A best practice for regulatory analysis is to ensure that all methods, data sources, assumptions, and any limitations or caveats are transparent. Specific references where available and technical appendices should be provided. When assumptions are necessary, it is important to provide the basis and rationale for those assumptions. For a preliminary regulatory impact analysis, agencies can also explicitly request public comment supported by data on any uncertain parameters and assumptions to inform changes for the final regulatory analysis. If there is uncertainty in underlying estimates or values, Circular A-4 recommends presenting a range of plausible values in addition to a primary estimate.

A supplemental section with an analysis of uncertainty and sensitivity could examine potential scenarios that encompasses the range of how the benefits and costs of the rule could vary. Sensitivity analysis is useful for identifying key drivers of costs and benefits and how the results change when those parameters vary. When important costs and benefits are difficult to quantify or monetize, there should be an explanation of why they cannot be fully monetized and a presentation of any available quantitative information.

Often it is easier to quantify and monetize compliance costs than the benefits of the rule. In such circumstances, agencies can consider conducting a breakeven

[41] The shadow price of capital is the ratio of the gross rate of return on capital over the sum of the consumption discount rate plus the capital depreciation rate. The previous Circular A-4 guidance recommended using two default discount rates: 3 percent and 7 percent. The 3 percent discount rate approximated the rate that the average saver uses to discount future consumption based on the real rate of return on long-term government debt as a measure of a "social rate of time preference" (SRTP). The 7 percent rate was an estimate of the "average before-tax rate of return to private capital in the U.S. economy" so as to approximate the opportunity cost of capital.

[42] Available at: https://www.reginfo.gov/public/jsp/Utilities/circular-a-4_regulatory-impact-analysis-a-primer.pdf.

analysis or a threshold analysis so as to find the value of a key parameter that yields positive net benefits. While a breakeven analysis addresses the question of how large non-quantified benefits would need to be for total benefits to equal costs, it cannot quantify its likelihood. If feasible and appropriate, a more formal treatment of uncertainty may involve probabilistic analysis of the key uncertainties using simulation models.

A.2.5 Summarizing the Regulatory Analysis

A regulatory analysis should include a plain language summary of the effects of the rule and include summary tables with estimates of benefits, costs, and transfers for the preferred regulatory option and alternatives considered. In organizing categories of benefits and costs, many agencies use a standardized accounting statement, as provided in Circular A-4, where benefits and costs are reported separately from transfers and other distributional effects. Benefits and costs are further categorized as: (1) monetized; (2) quantified but non-monetized; and (3) unquantified.

References

Ashenfelter, O. C., Hosken, D. S., & Weinberg, M. C. (2015). Efficiencies brewed: Pricing and consolidation in the US beer industry. *The RAND Journal of Economics, 46*(2), 328–361.

Balan, D. J., & Brand, K. (2023). Simulating hospital merger simulations. *The Journal of Industrial Economics, 71*(1), 47–123.

Barrette, E., Gowrisankaran, G., & Town, R. (2022). Countervailing market power and hospital competition. *Review of Economics and Statistics, 104*(6), 1351–1360.

Baslandze, S. (2022). Entrepreneurship through employee mobility, innovation, and growth. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4277191

Brand, K., Garmon C., & Rosenbaum T. (forthcoming). In the Shadow of antitrust enforcement: Price effects of hospital mergers from 2009–2016. *Journal of Law and Economics*.

Brand, K., & Rosenbaum, T. (2018). A review of the economic literature on cross-market health care mergers. *Antitrust LJ, 82*, 533.

Capps, C., Dranove, D., & Satterthwaite, M. (2003). Competition and market power in option demand markets. *RAND Journal of Economics, 854*, 737–763.

Chopra, R., & Khan, L. M. (2020). The case for "unfair methods of competition" rulemaking. *The University of Chicago Law Review, 87*(2), 357–380.

Diver, C. S. (1983). The optimal precision of administrative rules. *Yale LJ, 93*, 65.

Ehrlich, I., & Posner, R. A. (1974). An economic analysis of legal rulemaking. *The Journal of Legal Studies, 3*(1), 257–286.

Einav, L., Finkelstein, A., & Gupta, A. (2017). Is American pet health care (also) uniquely inefficient? *American Economic Review, 107*(5), 491–495.

Farrell, J., Balan, D. J., Brand, K., & Wendling, B. W. (2011). Economics at the FTC: Hospital mergers, authorized generic drugs, and consumer credit markets. *Review of Industrial Organization, 39*, 271–296.

Garmon, C. (2017). The accuracy of hospital merger screening methods. *The RAND Journal of Economics, 48*(4), 1068–1102.

Gowrisankaran, G., Nevo, A., & Town, R. (2015). Mergers when prices are negotiated: Evidence from the hospital industry. *American Economic Review, 105*(1), 172–203.

Hiraiwa, T., Lipsitz, M., & Starr, E. (2023). Do firms value court enforceability of noncompete agreements? A revealed preference approach. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4364674

Ho, K. (2006). The welfare effects of restricted hospital choice in the US medical care market. *Journal of Applied Econometrics, 21*(7), 1039–1079.

Hosken, D., & Tenn, S. (2016). Horizontal merger analysis in retail markets. In E. Basker (Ed.), *Handbook on the economics of retailing and distribution.* Edward Elgar Publishing.
Jaffe, S., & Weyl, E. G. (2013). The first-order approach to merger analysis. *American Economic Journal: Microeconomics, 5*(4), 188–218.
Johnson, M. S., Lavetti, K., & Lipsitz, M. (2021). The labor market effects of legal restrictions on worker mobility. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3455381.
Johnson, M. S., Lipsitz, M., & Pei, A. (2023). Innovation and the enforceability of noncompete agreements (No. w31487). National Bureau of Economic Research.
Johnson, M. S., & Lipsitz, M. (2022). Why are low-wage workers signing noncompete agreements? *Journal of Human Resources, 57*(3), 689–724.
Kaplow, L. (1992). Rules versus standards: An economic analysis. *Duke LJ, 42*, 557.
Lau, C. (2023). DIVRATIO: Stata module for estimating diversion ratios and willingness-to-pay from a semiparametric choice model. https://EconPapers.repec.org/RePEc:boc:bocode:s459169
Lipsitz, M., & Tremblay, M. J. (2021). Noncompete agreements and the welfare of consumers. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3975864
Lipsitz, M., & Starr, E. (2022). Low-wage workers and the enforceability of noncompete agreements. *Management Science, 68*(1), 143–170.
Lubbers, J. S. (2014). It's time to remove the mossified procedures for FTC rulemaking. *George Washington Law Review, 83*, 1979.
Manski, C. F., & Lerman, S. R. (1977). The estimation of choice probabilities from choice based samples. *Econometrica*, 1977–1988.
McFadden, D. L. (1984). Econometric analysis of qualitative response models. *Handbook of Econometrics, 2*, 1395–1457.
Miller, N. H., Remer, M., Ryan, C., & Sheu, G. (2017). Upward pricing pressure as a predictor of merger price effects. *International Journal of Industrial Organization, 52*, 216–247.
Panhans, M. T. (2023). healthcare.antitrust: Healthcare antitrust analysis. https://cran.r-project.org/web/packages/healthcare.antitrust/index.html
Parnes, L. B., & Jennings, C. J. (1997). Through the looking glass: A perspective on regulatory reform at the federal trade commission. *Administrative Law Review, 49*, 989.
Grosz & Raval (2023). Fraud across borders. SSRN 4333120.
Raval, D., & Rosenbaum, T. (2018). Why do previous choices matter for hospital demand? Decomposing switching costs from unobserved preferences. *Review of Economics and Statistics, 100*(5), 906–915.
Raval, D., & Rosenbaum, T. (2021). Why is distance important for hospital choice? Separating home bias from transport costs. *The Journal of Industrial Economics, 69*(2), 338–368.
Raval, D., Rosenbaum, T., & Tenn, S. A. (2017). A semiparametric discrete choice model: An application to hospital mergers. *Economic Inquiry, 55*(4), 1919–1944.
Raval, D., Rosenbaum, T., & Wilson, N. E. (2021). How do machine learning algorithms perform in predicting hospital choices? Evidence from changing environments. *Journal of Health Economics, 78*, 102481.
Raval, D., Rosenbaum, T., & Wilson, N. E. (2022). Using disaster-induced closures to evaluate discrete choice models of hospital demand. *The RAND Journal of Economics, 53*(3), 561–589.
Sacher, S., & Simpson, J. (2020). Estimating incremental margins for diversion analysis. *Antitrust Law Journal, 83*(2), 527–556.
Starr, E. (2019). Consider this: Training, wages, and the enforceability of covenants not to compete. *ILR Review, 72*(4), 783–817.
Starr, E., Balasubramanian, N., & Sakakibara, M. (2018). Screening spinouts? How noncompete enforceability affects the creation, growth, and survival of new firms. *Management Science, 64*(2), 552–572.
Wollmann, T. G. (2020). How to get away with merger: Stealth consolidation and its effects on us healthcare (No. w27274). National Bureau of Economic Research.