

# **The Evolution of Judicial Standards: Evidence from Litigated Merger Trials\***

**JEFFREY T. MACHER**

Georgetown University  
McDonough School of Business  
Washington, DC 20057  
[jeffrey.macher@georgetown.edu](mailto:jeffrey.macher@georgetown.edu)

**JOHN W. MAYO**

Georgetown University  
McDonough School of Business  
Washington, DC 20057  
[mayoj@georgetown.edu](mailto:mayoj@georgetown.edu)

**DAVID E.M. SAPPINGTON**

University of Florida  
Department of Economics  
Gainesville, FL 32611  
[sapping@ufl.edu](mailto:sapping@ufl.edu)

**MARK WHITENER**

Georgetown University  
McDonough School of Business  
Washington, DC 20057  
[markdwhitener@gmail.com](mailto:markdwhitener@gmail.com)

## **ABSTRACT**

A popular narrative suggests that, in the wake of the rise of the Chicago School, the judiciary has grown increasingly lax, making it difficult for antitrust agencies to successfully challenge mergers in court. We develop a theoretical framework to yield hypotheses regarding merger challenges, settlements and outcomes under varying judicial standards. We then undertake an empirical investigation of all mergers, challenges, and litigated outcomes in the U.S. over 1982-2021 to test for the presence of shifting judicial standards. Contrary to the popular narrative, we find evidence that judicial standards have become increasingly pro-enforcement over the past four decades.

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## 1. Introduction

Monday-morning assessments of merger trial outcomes are common. Proponents of a particular merger that is successfully blocked at trial will opine that the outcome is an indication that the judiciary has become overzealous in its interpretation of the Clayton Act's prohibition of mergers whose effects "may be substantially to lessen competition, or to tend to create a monopoly."<sup>1</sup> At the same time, a different adjudicated merger that is allowed to proceed will motivate critics to argue that the judiciary has become too lax in its interpretation of the Clayton Act.

Less common are attempts to systematically assess the body of merger outcomes to determine actual judicial trends and tendencies. This void has become more salient in recent years as a vocal narrative has emerged that suggests the judiciary, stimulated by the rise of the Chicago School, has become increasingly lax in its oversight of potentially anticompetitive mergers over time. For example, Baker and Shapiro (2008) criticize what they interpret to be "the too-ready acceptance by some courts and enforcers of unproven noninterventionist economic arguments about concentration, entry and efficiencies" (p. 266). Ashenfelter, Hoskens and Weinberg (2014) similarly argue that "[b]y the late 1980s, the burden of proof required of the U.S. antitrust agencies to challenge horizontal mergers had dramatically increased" (footnote omitted) and that "[t]his increase in the evidentiary burden placed on the government has substantially limited its ability to challenge horizontal mergers" (p. S68). Kwoka (2018) opines that "[t]he judiciary is demanding ever greater proof of predicted anticompetitive outcomes. Ideological forces outside the agency have fostered an anti-antitrust view." *The Economist* (2019) suggests that "American antitrust regulators and courts have been unforgivably lax."<sup>2</sup>

In this paper, we seek to add a more systematic lens to the evolution of judicial standards as they have been applied to proposed mergers. The task is made complicated, however, for at least two reasons. First, the primary variable of interest – shifts in judicial standards – is not directly measurable. Second, the most direct potential indicator of changes in judicial standards – courts' decisions to allow or disallow mergers – is only the last stage in a series of actions, which

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<sup>1</sup> 15 U.S. Code § 18

<sup>2</sup> See <https://www.economist.com/weeklyedition/2019-11-30> (p. 13). Also see, e.g., Yale University's Thurman Arnold Project (2020), which suggests that "interpretations of U.S. antitrust laws have been too lax toward consolidation" and that "Courts have lowered the burden on defendants to rebut structural presumption" (footnote omitted). See <https://som.yale.edu/centers/thurman-arnold-project-at-yale/modern-antitrust-enforcement>.

complicates the identification of changes in judicial standards. Our approach therefore necessarily entails both a novel theoretical framework and corresponding empirical analysis.

Our theoretical framing is set against the backdrop of an influential article by Priest and Klein (1984), which establishes an expectation that litigated outcomes in legal disputes will exhibit an even “50/50” split—with plaintiffs winning half the cases and defendants winning half the cases. This conclusion reflects the fact that litigated cases are not a random draw of all lawsuits filed. Instead, selection effects narrow cases that actually proceed to the litigation stage to cases that are most likely to “go either way.” Importantly, this 50/50 result has been interpreted to be independent of the stringency of – or shifts in – the judicial standard. To the extent that the Priest and Klein prediction holds, any informational value from trends in litigated case results is lost. Rather, deviations from 50/50 win-loss rates or trends in litigated outcomes over time arise from different litigant views of likely court outcomes, asymmetries in benefits and costs to litigants, or random errors. In contrast to Priest and Klein (1984), our theoretical model yields clear inferences regarding shifts in judicial standards from observable litigation challenges and outcomes.

Our analysis bears some resemblance to Waldfoegel (1995), in that we both draw conclusions about court standards from observed trial rates and court outcomes, but with important differences. Waldfoegel assumes that a plaintiff and a defendant receive distinct, imperfect information about the quality of the plaintiff’s case and the prevailing court standard. The two parties then announce their proposed terms of settlement. Settlement occurs if and only if the settlement payment the defendant offers exceeds the settlement payment the plaintiff demands.<sup>3</sup> In Waldfoegel’s model, variations in trial rates and court outcomes are driven by asymmetries in the payoffs the two potential litigants face if they proceed to trial and by differences in their assessments of the likelihood of prevailing in court. In our model, variations in trial rates and court outcomes are determined by the known judicial standard, by the known efficacy of the court in assessing the social harm a proposed merger would impose, and by the relationship between this social harm and the private profitability of the merger. Furthermore, in our model, a third party investigates proposed mergers and fashions remedies that would eliminate the associated social harm.<sup>4</sup>

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<sup>3</sup> Waldfoegel (1995) shows that Priest and Klein’s (1984) model does not necessarily predict that plaintiffs and defendants typically will prevail in court with equal probability, regardless of the prevailing court standard.

<sup>4</sup> Waldfoegel (1998) finds that models of divergent expectations with settlement (e.g., Priest and Klein, 1984; Waldfoegel, 1995) better explain observed data than do models in which one potential litigant has better information than the other about the likelihood the plaintiff will prevail in court.

Klerman and Lee (2014), Lee and Klerman (2016), and Klerman, Lee and Liu (2018) show that, in the presence of incomplete settling, empirically-observed judicial outcomes can provide information about shifts in judicial standards. We derive a corresponding conclusion in a related but distinct model that is designed to capture key elements of merger review policies, which differ both structurally and practically from canonical settlement models.

We modify the standard settlement model in four primary respects to render it more relevant to antitrust policy. First, unlike the standard settlement model, the plaintiff in our model is an antitrust agency (“Agency”) that must decide whether to legally challenge a proposed merger. That is, rather than taking the primary action (e.g., an accident) as given, we allow the action (whether and how to pursue a merger challenge) to be endogenous.<sup>5</sup> Second, we depart from the standard presumption of directly opposing interests of two potential litigants by introducing an antitrust authority that seeks to maximize social welfare whereas the merging parties seek to maximize profit. Third, we allow the antitrust authority to identify merger remedies (e.g., asset divestitures) that mitigate the social harm from proposed mergers. Fourth, the shift from a traditional litigation setting to an antitrust enforcement and litigation setting dictates a change in the information structure of the model we employ. Specifically, standard litigation models typically assume that the court has full information and the parties (here, the merging firms and the relevant Agency) receive noisy signals. In our setting, we assume that Agencies and the merging firms have better information about the harm from a merger than the court.

These modifications are motivated by several features of the antitrust enforcement and litigation setting. In our setting, merging parties, rather than courts, may reasonably be assumed to enjoy better information about present and future industry conditions. The merging parties also have privileged information about what actions they are likely to undertake if the merger is approved. Similarly, antitrust agencies specialize in assessing the competitive impacts of mergers, employing large staffs of experienced antitrust attorneys and many Ph.D. antitrust economists. In contrast, antitrust litigation occurs in generalist courts that only infrequently are charged with considering antitrust arguments from litigating parties.<sup>6</sup> For similar reasons, we assume that the

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<sup>5</sup> See also Shavell (1982) who extends the basic settlement model by endogenizing the plaintiff’s decision about whether to bring suit.

<sup>6</sup> Federal courts are rarely called upon to adjudicate antitrust matters. In the most recent five-year period over which data are available (2018–2022), 0.3 percent of civil cases commenced were antitrust-related while 99.7 percent of district court (and appeals court) civil cases commenced were unrelated to antitrust. See *Judicial Business of the*

merging firms and Agencies know the judicial standard that underlies the court's decision to effectively approve or deny the consummation of a proposed merger. In practice, the Agencies are likely to acquire this information (or at least acquire a relatively reliable signal about this standard) from their frequent, ongoing interactions with the court, while merging firms are likely to acquire this information from their attorney-advisors who also have frequent interactions with the Court.<sup>7</sup>

Our empirical framing is set within a literature that seeks to contribute insights into various stages of the litigation process.<sup>8</sup> In this vein, the paper most similar to ours is Perloff, Rubinfeld and Ruud (1996) which explicitly models and estimates the decision-to-litigate and trial-outcome stages and their interdependence in private antitrust cases. We similarly recognize the endogeneity of these stages, but the public merger enforcement process that is our focus dictates that our theoretical model and empirical estimation account for the initial Agency decision to challenge a given merger.

While Perloff, Rubinfeld and Ruud (1996) focus on the trial-outcomes and decision-to-litigate stages, Macher and Mayo (2021) instead examine the initial Agency decision to challenge proposed mergers. Their analysis finds that the intensity of merger challenges has increased over 1979-2017, the propensity to challenge is sensitive to Agency budgets, the upward trajectory of merger enforcement intensity dominates any differences that are associated with the political party of the current Administration, and a 2001 statutory increase in premerger filing thresholds altered Agency merger challenge decisions. These results inform our research approach. For instance, we incorporate resource constraints in our theoretical and empirical models, given the empirical salience of Agency budgets. We also examine political structure in the decision-to-litigate stage (despite its insignificance in the decision-to-challenge stage), given the ongoing interest in whether merger enforcement is influenced by political partisanship. Finally, we incorporate the 2001 premerger filing threshold change in our empirical analysis, given the salience of this institutional

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United States Courts, Tables C-2A (U.S. District Courts) and B-7 (U.S. Court of Appeals), available at <https://www.uscourts.gov/statistics-reports/analysis-reports/judicial-business-united-states-courts>.

<sup>7</sup> The assumption that well-informed parties have accurate knowledge of the judicial standard at any given moment in time is not inconsistent with the idea that general uncertainty prevails about how the standard has evolved over time. A time series of carefully designed surveys of leading antitrust attorneys and practitioners about the prevailing antitrust judicial standard could, in principle, reveal how it has changed over time. To the best of our knowledge, however, systematic, reliable surveys of this type have not been undertaken. Sokol et al. (2023) survey practicing attorneys about changes in antitrust enforcement under the Biden administration. Our analysis represents an alternative means to assess how the judicial standard has changed over time.

<sup>8</sup> See Cooter and Rubinfeld (1989) for an early literature review.

change. Macher and Mayo (2021) solely examine the decision-to-challenge stage, while we examine the evolution of judicial standards over time and in so doing incorporate the additional decision-to-litigate and trial-outcome stages in the merger enforcement process.

This paper makes three primary contributions. First, it provides a theoretical framework within which shifts in judicial standards can be inferred from the actions of firms, agencies, and courts. Second, it overcomes an historical empirical impediment to making inferences regarding shifts in judicial standards caused by sample selection hurdles. In the case of mergers, interpretations of judicial outcomes as reflective of shifts in judicial standards can be confounded by the possibility that litigated merger cases are a nonrandom set of all challenged mergers. Moreover, the observed set of challenged mergers is not likely a random sample of all mergers reported to the Agencies. Our empirical analysis addresses these sample selection issues to the extent permitted by the data, promoting consistent estimates of merger challenges, litigated cases, and judicial outcomes. Third, it provides systematic rather than anecdotal evidence of shifts in judicial standards based upon the population of all mergers reported to the Agencies over 1979-2021. Contrary to the popular narrative, the empirical results indicate that the pattern of merger challenges that have proceeded to trial and the evolution of trial outcomes reflect judicial standards that have become increasingly pro-enforcement.

The paper proceeds as follows. Section 2 provides discussion of the institutional and legal setting within which we have conducted our analysis. Section 3 develops a conceptual framework that generates propositions that link actions by the Agencies, the merging firms, and the courts to shifts in judicial standards. Section 4 presents the empirical analysis, which utilizes the population of all proposed mergers, agency challenges, fully-litigated merger trials, and trial outcomes in the United States (U.S.) over 1982-2021. Section 5 provides concluding comments.

## 2. Institutional and Legal Background

Mergers between firms constitute a common vehicle for reorganizing economic activity. Although mergers can enhance economic efficiency, they have the potential to harm competition in some cases. Such harm to competition is addressed by Section 7 of the Clayton Act, which prohibits mergers and acquisitions where “the effect of such acquisition may be substantially to lessen competition or tend to create a monopoly.”<sup>9</sup> The responsibility for enforcing Section 7 falls to the

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<sup>9</sup> 15 U.S. Code § 18

Antitrust Division of the Department of Justice (DOJ) and the Federal Trade Commission (FTC) (collectively, the Agencies).

To facilitate this oversight and enforcement responsibility, Congress enacted the Hart-Scott Rodino Antitrust Improvement Act of 1976 (HSR).<sup>10</sup> This Act requires merging parties whose merger valuation exceed an evolving threshold (viz., the “size-of-transaction” test) and whose size exceed certain evolving levels (viz., the “size-of-person” test) file pre-merger notification forms (and accompanying information) with the Agencies. This information receives a preliminary screen by the Agencies and a judgment on whether to proceed with a more detailed merger investigation.<sup>11</sup>

For proposed mergers that proceed to a more thorough Agency review, some are determined by the investigating Agency to violate Section 7. At this point, a remedy may be fashioned which allows the offending merger to proceed. In some instances, however, no acceptable remedy emerges, at which time the legality of the proposed merger may proceed to trial for adjudication.<sup>12</sup>

The administrative processes by which the respective Agency challenges and litigates a given merger differ. The DOJ process is more straightforward: if a satisfactory remedy to anticompetitive concerns cannot be fashioned, the DOJ files a complaint in federal district court seeking to permanently enjoin the merger from going forward, where the case is litigated under Section 7. When the FTC determines a merger is problematic and no remedy emerges, it also files a federal court complaint, but seeks a preliminary injunction under Section 7 to prevent the merger from being consummated pending FTC administrative litigation. As a practical matter, the federal court injunction actions often determine the outcome in both FTC and DOJ cases. If the FTC loses the federal court case and the transaction is allowed to close, it is often difficult as a practical matter for the FTC to gain effective relief after months or years of administrative litigation, so the FTC may drop the case. Conversely, if the FTC wins in federal court and the transaction is enjoined,

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<sup>10</sup> Public Law 94-435. There were a number of landmark merger cases prior to HSR [e.g., *Brown Shoe Co. v. United States* 370 U.S. 294 (1962)]. These cases tended to focus heavily on whether the structural changes to the industry brought about by the proposed merger were seen as problematic. Subsequent to the passage of HSR, this focus began to shift, with greater emphasis on whether proposed mergers would result in adverse economic effects such as elevated pricing or diminished innovation in the focal industry. The merger evaluation process also began to entail bargaining between the merging parties and the relevant Agency, followed by litigation. The data necessary for our empirical analyses in Section 4 do not extend to the pre-HSR period.

<sup>11</sup> See e.g., Mayo, et al. (2023) for a detailed discussion of this preliminary step in the merger review process.

<sup>12</sup> For mergers that are challenged by the FTC, it is common for the Agency to assert that the proposed merger violates Section 5 of the FTC Act, 15 U.S.C. § 45, which prohibits “unfair methods of competition.”

the parties will often abandon the proposed transaction rather than attempt to hold the deal together during lengthy administrative proceedings.

As with all trials, merger trials occur in an adversarial setting. The relevant Agency provides evidence and arguments that the proposed merger violates Section 7, while the merging firms provide evidence and arguments to the contrary. Two differentiating features of merger trials suggest that the information signals received by the courts can be noisy: first, the courts typically must reach a conclusion regarding the likely proposed merger impacts on *future* industry competition;<sup>13,14</sup> and second, federal judges typically oversee relatively few antitrust cases.

Merger case law has evolved over time from a period of intense—if not exclusive—focus on the market share consequences of a merger to a broader consideration of the post-merger performance determinants. This evolution replaced simple conclusions based on market structure alone with more complex and sophisticated methods often drawn from the economics discipline. At first blush—and as is now popularly argued—these shifts have made the Agencies’ tasks more difficult. For instance, the opportunity of merging firms to provide evidence that market entry will be sufficiently likely and potent as to prevent post-merger price increases requires the Agencies assess and successfully rebut such evidence if they are to prevail at trial.

In a number of ways, however, Agency activities undertaken as well as court opinions have strengthened the Agencies in their prosecution of—and likely success with—merger challenges. To fully appreciate these developments, it is important to understand both the foundational role and the evolution of the Agencies’ own enforcement policies: most directly, via an historical examination of the Horizontal Merger Guidelines (hereafter, HMGs). As enunciated in the initial (1968) Department of Justice’s Merger Guidelines, “[t]he purpose of these guidelines is to acquaint the business community, the legal profession, and other interested groups and individuals with the standards currently being applied by the Department of Justice in determining whether to challenge corporate acquisitions and mergers under Section 7 of the Clayton Act”.<sup>15</sup> While the stated purpose of the HMGs has not changed markedly over the years, both the analytical tools embedded within the Guidelines and their importance in judicial merger opinions have evolved considerably. In

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<sup>13</sup> In contrast, standard tort litigation that is the subject of considerable research typically involves disputes over the liability and damages from events that *precede* the trial.

<sup>14</sup> An exception arises when, on rare occasions, an Agency challenges a merger after it has been consummated.

<sup>15</sup> 1968 Merger Guidelines, U.S. Department of Justice, available at: <https://www.justice.gov/archives/atr/1968-merger-guidelines>.



particular, although the language in the HMGs is not binding on the courts,<sup>16</sup> judicial opinions in merger cases have increasingly and favorably incorporated HMG language and concepts.<sup>17</sup> The 2010 HMGs recognize their potential influence on the courts, stating that “[t]hey may also assist the courts in developing an appropriate framework for interpreting and applying the antitrust laws in the horizontal merger context.”<sup>18</sup> Indeed, over 90 percent of post-2010 merger opinions make direct reference to the HMGs.<sup>19</sup>

Given this growing role of the HMGs on the courts, their introduction of new tools and methods over time have plausibly played an important role in the evolution of court standards in litigated merger cases.<sup>20</sup> These changes have not unequivocally increased the burden for the Agencies to prevail in litigated merger challenges, but instead often cut the other way. Several changes that may have facilitated successful merger challenges are particularly notable.

First, the 1992 HMGs broadened the toolkit for the Agencies to challenge—and for the courts to block—proposed mergers by articulating the potential for mergers to harm competition by the unilateral post-merger behavior of the surviving firm—independent of any change in post-merger collusive tendencies. This expansion by the Agencies to consider anticompetitive post-merger threats from unilateral effects was seen as “a paradigm shift in merger analysis” (Baker, 1997). Since the initial introduction of unilateral effects, the HMGs have subsequently identified or

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<sup>16</sup> *Federal Trade Commission v. PPG Industries, Inc.* 798 F.2d 1500 (D.C. Cir. 1986), footnote 4. Decided Aug 22, 1986.

<sup>17</sup> Greene (2006) finds that with each iteration, the merger guidelines have gained more influence in judicial opinions in merger cases.

<sup>18</sup> Horizontal Merger Guidelines, U.S. Department of Justice and the Federal Trade Commission, August 19, 2010, available at <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>.

<sup>19</sup> Authors’ calculation. See Shapiro and Shelanski (2021) for a detailed discussion of how the 2010 HMGs have been received by the federal courts. The authors review all judicial decisions in merger cases over 2000-2020, and find that the 2010 HMGs have been “well accepted by the courts...In particular, we find that the richer explanation of how the Agencies use qualitative and quantitative evidence to assess competitive effects has favorably influenced the case law and strengthened merger enforcement” (p. 53). They observe that the 2010 HMGs “had the strongest effect on the case law in the area of unilateral effects...The case law now exhibits much greater receptivity to a government showing that the merger will lead to higher prices due to the loss of direct competition between the two merging firms. The courts have also followed the 2010 HMGs by more willingly defining markets around targeted customers” (p. 51). Shapiro and Shelanski find “no instances in which the courts rejected any of the 2010 innovations. Nor do we find any instance in which any aspect of the 2010 HMGs – notably the reduced emphasis on market definition or the higher HHI thresholds – created an impediment for the DOJ or the FTC in bringing or proving a case in court” (p. 78).

<sup>20</sup> Shapiro and Shelanski (2021) observe that the courts’ embrace of the 2010 HMGs “has been similar to past judicial responses to changes in the Guidelines: Courts generally accept the analytical methods that the Guidelines describe; show respect to the experience of the DOJ and the FTC that lies behind the Guidelines changes; but still ground their decisions in principles established by judicial precedent. This is how the Guidelines gradually influence the evolution of the case law” (p. 53).

expanded several additional means by which anticompetitive harm may arise from these effects. For example, the 2010 HMGs expand the discussion of unilateral effects to include auction settings, capacity manipulation, and harm resulting from reduced innovation and product variety. In short, the Agencies have now increasingly employed an expanding array of unilateral theories of harm, which has led to firms abandoning mergers, to consent decrees, and to government victories in courtrooms.<sup>21</sup>

Second, in contrast to the 1968 HMGs that did not reference entry conditions for the consideration of horizontal mergers, the 1982 HMGs afforded merging parties the opportunity to defend their proposed merger by appealing to “easy” entry. However, the ability of these parties to offer an “easy entry” defense of an otherwise problematic potential merger was tightened in the 1992 HMGs which required that post-merger entry be “timely, likely and sufficient” to deter anticompetitive price increases.<sup>22</sup> For each of these qualifiers, successive HMGs iterations have provided specific tests that must be passed for entry to be judged “so easy that the merged firm and its remaining rivals in the market, either unilaterally or collectively, could not profitably raise price or otherwise reduce competition compared to the level that would prevail in the absence of the merger.”<sup>23</sup> Moreover, these tests of the timeliness, likelihood, and sufficiency of entry have subsequently been widely adopted by the courts—effectively raising the judicial bar for proposed merging parties to demonstrate that ease of entry will successfully mitigate post-merger tendencies for price increases.<sup>24</sup>

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<sup>21</sup> As early as 1996, the FTC advanced unilateral theories of harm that led to merger abandonments (e.g., <https://www.ftc.gov/public-statements/1996/08/unilateral-competitive-effects-theories-merger-analysis>). Courts too have found unilateral theories of harm to be useful in opinions blocking proposed mergers. See, e.g., *FTC v. Swedish Match*, 131 F. Supp. 2d 151, 169 (D.D.C. 2000) (indicating that “...the weight of the evidence demonstrates that a unilateral price increase by Swedish Match is likely after the acquisition because it will eliminate one of Swedish Match's primary direct competitors.”). See also *United States v. Bazaarvoice, Inc.*, Case No. 13-cv-00133, 2014 WL 203966, at \*184 (N.D. Cal. 2014) (in which the DOJ advanced a unilateral theory of harm and the court accepted this theory, stating “[t]he merger of Bazaarvoice and PowerReviews is likely to result in significant anticompetitive unilateral effects.”). This is not to say that the Agencies have succeeded with all unilateral effects cases [see e.g., *United States v. Gillette Co.*, 828 F. Supp. 78, 84 (D.D.C. 1993)], but rather only that, as posited by Hovenkamp (2009), “[I]n a great many cases unilateral effects may be more readily capable of proof than is the likelihood of collusion.” (p.20)

<sup>22</sup> Horizontal Merger Guidelines, U.S. Department of Justice and the Federal Trade Commission, April 2, 1992, p. 25.

<sup>23</sup> Horizontal Merger Guidelines, U.S. Department of Justice and the Federal Trade Commission, August 19, 2010, p. 28.

<sup>24</sup> See for instance, *United States v. Aetna Inc.*, 240 F. Supp. 3d 1, (D.D.C. 2017); *United States v. Energy Sols, Inc.*, 265 F. Supp. 3d 415 (D. Del. 2017); *United States v. H&R Block, Inc.*, 833 F. Supp. 2d 36, 73 (D.D.C. 2011); and *FTC v. Cardinal Health*, 12 F. Supp. 2d 34 (D.D.C. 1998). All of these opinions explicitly rely upon the HMGs’

Third, judicial standards have—perhaps nominally but not in substance—created potential burdens for the Agencies in the area of “efficiencies.” Like entry, an efficiencies-based defense of a proposed merger was not anticipated in the earliest HMGs. However, the mere fact that the 1982 HMGs recognized the potential for an efficiencies defense to an otherwise problematic merger may not unequivocally have raised the Agencies’ burdens. Indeed, after opening the door to an efficiencies defense, subsequent HMGs required that efficiencies be merger-specific, verified, and not the product of anticompetitive reductions in output or quality (Kwoka, 2015). Similarly, as early as 1991, a federal appeals court had ruled that “[o]f course, once it is determined that a merger would substantially lessen competition, expected economies, however great, will not insulate the merger from a [S]ection 7 challenge.”<sup>25</sup> More recently, the Court of Appeals for the District of Columbia has confirmed the high burden imposed on merging parties to successfully mount such a defense, ruling that efficiencies must: (1) offset the likely harm to competition; (2) be merger-specific; (3) be verifiable; (4) not arise from anticompetitive effects; and (5) ultimately be passed on to consumers.<sup>26</sup> Indeed, the court went so far as to opine that “[d]espite...widespread acceptance of the potential benefits of efficiencies as an economic matter...it is not at all clear that they offer a viable legal defense to illegality under Section 7.”<sup>27</sup> Collectively, the tightened language from the HMGs and from the courts raise the practical question of how successful merging firms can be in their efficiency-based claims. Consequently, it is far from clear that the mere possibility of an efficiencies defense has raised the judicial burden faced by the Agencies in recent litigated merger cases; instead, the language around efficiencies in the HMGs and in court opinions appear to have evolved toward an increasing burden faced by proposed merging parties.

Fourth, successive HMG iterations and court opinions have added a variety of new economic tools by which the Agencies and the courts may advance theories of harm to more successfully block problematic mergers. For example, the 2010 HMGs provide that the agencies may employ direct evidence (either historical events or “natural experiments”) such as the “impact of recent

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“timely, likely and sufficiency” language as the standard for judging whether entry is sufficiently easy to deter the merging firms from raising prices after the merger.

<sup>25</sup> FTC v. Univ. Health, Inc. 938 F. 2d 1206 (11<sup>th</sup> Cir. 1991).

<sup>26</sup> United States v. Anthem, Inc., 855 F.3d 345 (D.C. Cir. 2017).

<sup>27</sup> Id. at 353.

mergers, expansion, or exit in the relevant market.”<sup>28</sup> Additionally, the 2010 HMGs include language indicating that the positioning of individual firms within a market is important – beyond their size – as the Agencies consider merger challenges. Specifically, the HMGs indicate that “[t]he extent of direct competition between the products sold by the merging parties is central to the evaluation of unilateral price effects” (p. 20). This focus on the extent to which merging parties are direct rivals within a market has provided the Agencies a new vehicle to successfully challenge mergers.<sup>29</sup> Yet another new HMGs tool successfully employed in court by the Agencies stems from bargaining theory. In particular, the HMGs now indicate that “[a] merger between two competing sellers prevents buyers from playing those sellers off against each other in negotiations. This alone can significantly enhance the ability and incentive of the merged entity to obtain a result more favorable to it, and less favorable to the buyer, than the merging firms would have offered separately absent the merger” (p. 22). Although the success of this theory has been mixed,<sup>30</sup> it has expanded and arguably enhanced the Agencies’ ability to prevail in court.

In addition to evolution of the HMGs, court opinions themselves have evolved in ways that sometimes have strengthened the hands of the Agencies in merger challenges. For example, in *FTC v. HJ Heinz Co.*, 116 F. Supp. 2d 190 (D.D.C. 2000), the Court of Appeals for the District of Columbia indicated that generic claims of structural market barriers to collusion (such as the need for cartel members to agree on price and output, post-cartel incentives for participants to defect from such agreements by expanding output, and difficulties in sustaining collusive prices when firms cannot readily identify other firms’ prices) are insufficient to rebut the “normal presumption” that increased market concentration raises both the incentive and ability for post-merger behaviors to increase prices. Similarly, the courts have increasingly embraced the proposition that mergers that substantially reduce or eliminate direct competition between close competitors often result in

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<sup>28</sup> This approach was employed by the Department of Justice in a recent successful merger challenge: *United States v. EnergySols, Inc.* 265 F. Supp. 3d 415 (D. Del. 2017). In that case, the price-reducing effects of a recent entry into the relevant market were employed to infer that the elimination of the new competitor through merger would correspondingly lead to post-merger price increases. Disclosure: One of the authors of this paper, John Mayo, served as the Economic Expert for the Department of Justice in this case.

<sup>29</sup> *United States v. Anthem, Inc.* 236 F. Supp. 3d 171 (D.D.C. 2017).

<sup>30</sup> Bargaining theory was employed in both *Anthem* [*Anthem, Inc.*, 855 F.3d 345 (D.C. Cir. 2017)] and *AT&T-Time Warner* [*United States v. AT&T, Inc.*, 916 F.3d 1029 (D.C. Cir. 2019)], with the Agencies prevailing in the former and losing in the latter. Even in this latter case, however – which involved a vertical merger -- the court endorsed the legitimacy of the Agencies’ new bargaining theory: “... the record shows that the district court accepted the Nash bargaining theory as an economic principle generally but rejected its specific prediction in light of the evidence that the district court credited.” *United States v. AT&T, Inc.*, 916 F.3d 1029, 1039 (D.C. Cir. 2019)]. *United States v. AT&T, Inc.*, 916 F.3d 1029, 1039 (D.C. Cir. 2019).

a lessening of competition.<sup>31</sup> Additionally, the Supreme Court has fortified the limitations that may be applied successfully for merging parties to claim a “state action” immunity defense to an otherwise anticompetitive merger.<sup>32</sup>

A further evolution within the courts involves a concern that arose from the Baker Hughes decision.<sup>33</sup> In that case, the court seemed to infer that the stronger the *prima facie* structural case presented by the Agencies in merger litigation, the more robust should be the defendants’ ability to rebut that showing (Hovenkamp and Shapiro, 2018). To the extent that the Baker Hughes case raised the possibility of such a standard-setting shift for the courts, any such implication was put to rest in 2017 when the DC Court of Appeals indicated that “[t]he more compelling the *prima facie* case, the more evidence the defendant must present to rebut it successfully.”<sup>34</sup>

Finally, the narrative regarding shifting judicial standards often points to a weakening of the “structural presumption”—first established in *United States v. Philadelphia National Bank*.<sup>35</sup> In this case, the Court indicated that “a merger which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms...is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anticompetitive effect.”<sup>36</sup> Baker and Shapiro (2008) argue the structural presumption was substantially weakened as “Courts and enforcers today place less weight on market structure, pay closer attention to possible expansion by smaller suppliers and entry by new ones, and exhibit less hostility to merger efficiencies” (p. 29).

Yet, while both the HMGs and the courts have expanded their assessment of the competitive implications of mergers beyond an exclusive look at market share effects, the evolution of litigated

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<sup>31</sup> See *Anthem*, *supra* note 26, which cites both *Staples I*, 970 F. Supp. 1066, 1083 (D.D.C. 1997) and *Staples II*, 190 F. Supp. 3d 100, 131 (D.D.C. 2016) in finding that “the elimination of a particularly aggressive competitor in a highly concentrated market [is] a factor which is certainly an important consideration when analyzing possible anti-competitive effects.” And, as affirmed in *Anthem* “this is true even where the merging parties are not the only two, or even the two largest, competitors in the market.” (citations omitted)

<sup>32</sup> See *FTC v. Phoebe Putney Health Sys.*, 568 U.S. 216 (2013): the “state action” doctrine provides, subject to limitations, antitrust exemption to states and municipalities in situations in which they clearly articulate and actively supervise firms’ behaviors which would otherwise be anticompetitive. For a more complete discussion of the state action doctrine, see Areeda, Kaplow and Edlin (2013).

<sup>33</sup> *United States v. Baker Hughes, Inc.* 908 F.2d 981 (D.C. Cir. 1990).

<sup>34</sup> *Anthem*, *supra* note 18 at 349-50.

<sup>35</sup> 374 U.S. 321 (1963).

<sup>36</sup> *Id.* at 363.

merger opinions makes abundantly clear that the structural presumption remains central in merger analysis. Indeed, under a burden-shifting precedent established in the Baker Hughes case, once the Agency has shown that a merged firm controls an undue share of the relevant market and would result in a significant increase in market concentration, a “presumption” exists that the merger will substantially lessen competition.<sup>37</sup> Once this presumption is established, the burden shifts to the merging parties to rebut the presumption.<sup>38</sup> The practical implication of this burden-shifting can be quite important in practice as, once met, the difficulty the merging parties (Agencies) face in securing a favorable ruling is elevated (reduced). Indeed, we are unaware of any litigated merger case employing this now standard burden-shifting framework in which the government did not successfully “shift the burden” in court.<sup>39</sup>

In sum, while a narrative of easing judicial standards for merging firms has emerged, Agency developments and court opinions suggest otherwise. Whether and how judicial standards applied to mergers have shifted is thus an open question to which we now turn.

### 3. The Model

To infer how the prevailing judicial standard has evolved over time from observed actions and outcomes, it is important to employ a theoretical framework that captures the essence of the multi-step merger enforcement process. Figure 1 summarizes the steps that ultimately produce the observed outcomes of litigated merger challenges. First, among the set of all conceivable mergers, only some mergers are proposed. Second, among the set of proposed mergers, the Agencies challenge some mergers and decline to challenge others. Third, among the set of challenged

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<sup>37</sup> *Heinz*, 246 F. 3d at 715.

<sup>38</sup> See *Anthem, Inc.* 236 F. Supp. 3d 171 (D.D.C. 2017); *Baker Hughes, Inc.*, 908 F.2d at 982. Notably, the structural presumption established through judicial opinions is reflected in language in the 2010 HMGs, which state “Mergers that cause a significant increase in concentration and result in highly concentrated markets are presumed to be likely to enhance market power, but this presumption can be rebutted by persuasive evidence showing that the merger is unlikely to enhance market power.” (p. 3)

<sup>39</sup> Perhaps for this reason, Hovenkamp and Shapiro (2019) conclude that the structural presumption is “alive and well.” (p. 2014) In addition, although Shapiro and Shelanski (2021) observe that the 2021 HMGs raised the HHI thresholds that trigger a presumption of harm, they find no evidence that the Guidelines weakened the structural presumption. Rather, they conclude that the Guidelines “made it easier for the government to establish the presumption” by making it harder for parties to undermine the government’s market definition. “Indeed, in almost every case where the government establishes the structural presumption, the government wins” (p. 60). Shapiro and Shelanski also find no indication that the higher HHI thresholds have caused the Agencies to tolerate higher market shares. Comparing litigated mergers in 2000-2010 vs. 2010-2020, the authors find no increase, but rather a modest decrease, in the HHI levels alleged by the government (p. 64).

mergers, only a subset proceed to trial. Finally, among the set of litigated mergers, the Agencies win some challenges and lose others.

--- Insert Figure 1 Here ---

Changes in judicial standards can potentially affect each of the steps identified in Figure 1, which confounds simple interpretations of observed outcomes. For instance, an increasing Agency win rate for litigated mergers might invite the simple interpretation that the courts' judicial standards have become more stringent (pro-enforcement) over time. This interpretation, however, may be too simplistic. For instance, the pool of litigated mergers may itself be affected by, among other things, the evolution of judicial standards. In this event, Agency win rates may be determined in part by the altered mix of procompetitive and anticompetitive mergers that proceed to trial, confounding the interpretation of changing Agency win rates as attributable to changing judicial standards. Similarly, to the extent that merger challenges are not exogenously determined but rather reflect Agency choices, merger enforcement may rise or fall depending not on the stringency of judicial standards but on changing governmental policies. It is also conceivable that the observed set of mergers itself is endogenous to judicial standards, with more (less) mergers proposed under lax (tight) judicial standards. The presence of these stages creates sample-selection challenges that we address below.

The following simple model of the activities of a court, an antitrust authority ( $A$ ), and the parties to a potential merger ( $M$ ) helps to analyze these effects more formally. We describe the model in three steps. First, we review the court's operation. Second, we describe  $A$ 's activities. Finally, we characterize  $M$ 's behavior.

If a proposed merger is challenged in court, the court proceeding generates a signal  $s \in [\underline{s}, \bar{s}]$  about the social harm  $h \in [\underline{h}, \bar{h}]$  the proposed merger would generate. This harm might reflect, for example, the amount by which the proposed merger would reduce consumer welfare by facilitating higher prices for  $M$ 's products.  $h$  can be negative, reflecting the fact that synergies can enable merging parties to set lower prices or deliver higher levels of product quality.<sup>40</sup>

Higher realizations of the court signal indicate that the proposed merger is more likely to impose relatively pronounced social harm. Consequently, the court prohibits a merger if the signal

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<sup>40</sup> A merger might also increase welfare by motivating non-merging parties to compete more vigorously.

generated during the court proceeding exceeds a threshold,  $\hat{s}$ , which represents the prevailing judicial antitrust standard. Otherwise, the court permits the proposed merger to proceed.

The prevailing judicial antitrust standard,  $\hat{s}$ , is known to all parties in our model.<sup>41</sup> A smaller value of  $\hat{s}$  denotes a more stringent (i.e., “pro-enforcement”) standard in the sense that the court signal is more likely to exceed the prevailing standard (so the court is more likely to prohibit a proposed merger) as  $\hat{s}$  declines, *ceteris paribus*. The standard that prevails at a given moment in time reflects the factors identified in Section 2, which include the latest economic and legal theories, the principles established in the most recent HMGs, and all established case law. The court assessment ( $s$ ) of the harm the merger would likely cause if it were to be consummated reflects such factors as the actual harm the merger would cause, the corresponding evidence presented in court, and the ideology of the presiding judge.<sup>42</sup> Thus,  $\hat{s}$  is an exogenous parameter that is known to the relevant parties in the model, whereas  $s$  is the realization of a random variable that is influenced by the relevant value of  $h$ , among other factors.

The association between the court signal and the actual social harm from a merger is captured by  $F(s|h)$ , the distribution function for  $s$ , given  $h$ .  $f(s|h)$  is the corresponding conditional density function.<sup>43</sup> We assume  $\frac{\partial F(\hat{s}|h)}{\partial h} < 0$  for all  $\hat{s} \in (\underline{s}, \bar{s})$  and  $h \in [\underline{h}, \bar{h}]$ , so the probability of a court signal below the threshold  $\hat{s}$  declines as  $h$  increases. Intuitively, as the actual harm a proposed merger would cause increases, the likelihood the court will approve the proposed merger declines, holding the prevailing judicial standard constant. In this sense, the court signal is informative (but not perfectly so) about the social harm the proposed merger would actually cause if it were consummated.

The mergers that arise, and thus their associated harm, are captured by  $g(h|\hat{s})$ , the conditional density function for  $h$ , given  $\hat{s}$ .  $G(h|\hat{s})$  is the corresponding conditional distribution function. The mergers that arise and their associated harm can be influenced by many factors, including the

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<sup>41</sup> In practice,  $A$  is likely to acquire this information (or at least a relatively reliable signal about  $\hat{s}$ ) from its frequent, ongoing interactions with the Court.  $M$  is likely to acquire this information from the attorneys and/or advisors it hires, who also have frequent interactions with the Court. As explained in footnote 7 above, the assumption that well-informed parties have accurate knowledge of  $\hat{s}$  at any given moment in time is consistent with the idea that general uncertainty prevails about how  $\hat{s}$  has evolved over time.

<sup>42</sup> A judge’s ideology can affect how they evaluate the conflicting evidence presented in court. See Bonica and Sen (2021), for example.

<sup>43</sup>  $f(\cdot)$  is assumed to have strictly positive support on  $[\underline{s}, \bar{s}]$  for all  $h \in [\underline{h}, \bar{h}]$ .  $F(\cdot)$  is assumed to be continuously differentiable for all  $s \in [\underline{s}, \bar{s}]$  and  $h \in [\underline{h}, \bar{h}]$ .



prevailing industry structure, the price elasticity of demand for  $M$ 's products, and potential synergies in  $M$ 's operations. In principle, a more stringent court standard might discourage  $M$  from proposing some or all mergers. We therefore allow for the possibility that the prevailing standard ( $\hat{s}$ ) might affect  $g(\cdot)$ .

The mergers that entail the greatest social harm ( $h$ ) are also the mergers that generate the most profit ( $\pi(\cdot)$ ) for  $M$ . This positive association between  $h$  and  $\pi(h)$  arises naturally when, for example, a merger enhances the ability of the merging parties to increase prices profitably. Formally, we assume  $\pi'(h) \geq 0$  for all  $h \in [\underline{h}, \bar{h}]$ , where  $\pi(h)$  is the incremental profit  $M$  would derive from a merger that generates social harm  $h$  in the absence of any action to mitigate the harm (e.g., asset divestiture).

We next describe the operations of the antitrust authority ( $A$ ).  $A$  first performs an initial review of all proposed mergers and ranks them according to the social harm ( $h$ ) they would cause if they were implemented without mitigation.  $A$  then performs a more detailed investigation of as many of the proposed mergers as possible, given the resource constraint it faces.  $A$ 's detailed investigations focus on those mergers that would cause the most social harm: i.e., those with the highest values of  $h$ . For each proposed merger it investigates in detail,  $A$  identifies a remedy that would eliminate the social harm from the merger.  $A$  does not contest a proposed merger if  $M$  implements the identified remedy, thereby eliminating the social harm from the proposed (modified) merger.<sup>44</sup> In contrast,  $A$  challenges any proposed merger for which it has identified a remedy if  $M$  declines to implement the remedy.

In the absence of a binding resource constraint,  $A$  conducts a detailed review of, and identifies a remedy for, each proposed merger that would impose social harm, i.e., for each merger with  $h \in (0, \bar{h}]$ .<sup>45</sup>  $A$  conducts a detailed review of fewer proposed mergers when its resource constraint binds. Formally, in this case,  $A$  conducts a detailed review of, and identifies remedies for, proposed mergers with  $h \in (h_r, \bar{h}]$ , where  $h_r \in [0, \bar{h}]$ .<sup>46</sup>  $h_r$  increases as  $A$ 's resource constraint becomes

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<sup>44</sup> When  $M$  implements the remedy, its incremental profit from the (modified) merger is  $\pi(0)$ . This profit can be positive, perhaps because the merger, as modified by the remedy, still generates synergies that reduce costs, thereby increasing profit even in the absence of price increases.

<sup>45</sup> No remedies are specified for a proposed merger with  $h \leq 0$ .  $A$  does not contest any such merger.

<sup>46</sup> The setting in which  $A$  faces no resource constraints is the special case of our model in which  $h_r = 0$ .

more binding.  $A$  does not contest the proposed mergers it is unable to review in detail. These are the mergers that entail relatively small or no social harm, i.e., those with  $h \in [\underline{h}, h_r]$ .

We next analyze  $M$ 's choice between implementing the remedy that  $A$  identifies or proceeding to court when  $h \in (h_r, \bar{h}]$ .<sup>47</sup> To do so, let  $B(h, \hat{s})$  denote  $M$ 's expected private benefit from proceeding to court, given  $h$  and  $\hat{s}$ . This expected benefit is the difference between: (i) the product of the probability the merger is approved (because the court signal does not exceed  $\hat{s}$ ) and  $M$ 's incremental profit from the merger; and (ii)  $M$ 's cost of participating in a court proceeding,  $K_M > 0$ . Formally:

$$B(h, \hat{s}) = F(\hat{s} | h) \pi(h) - K_M. \quad (1)$$

Let  $\tilde{h} \in (h_r, \bar{h})$  denote the value of  $h$  at which  $M$  is indifferent between proceeding to court and implementing the remedy identified by  $A$ .<sup>48</sup> Formally,  $\tilde{h}$  is defined by:<sup>49</sup>

$$B(\tilde{h}, \hat{s}) = \pi(0). \quad (2)$$

To determine how a change in the court standard ( $\hat{s}$ ) affects  $M$ 's decision about whether to proceed to court, we differentiate equation (2) to obtain:

$$\frac{\partial B(\tilde{h}, \hat{s})}{\partial \tilde{h}} d\tilde{h} + \frac{\partial B(\tilde{h}, \hat{s})}{\partial \hat{s}} d\hat{s} = 0 \quad \Rightarrow \quad \frac{d\tilde{h}}{d\hat{s}} = -\frac{\frac{\partial B(\tilde{h}, \hat{s})}{\partial \hat{s}}}{\frac{\partial B(\tilde{h}, \hat{s})}{\partial \tilde{h}}}. \quad (3)$$

Because  $M$  only pursues mergers for which  $\pi(\cdot) > 0$ , equation (1) implies:

$$\frac{\partial B(\tilde{h}, \hat{s})}{\partial \hat{s}} = f(\hat{s} | \tilde{h}) \pi(\tilde{h}) > 0; \text{ and} \quad (4)$$

$$\frac{\partial B(\tilde{h}, \hat{s})}{\partial \tilde{h}} = \frac{\partial F(\hat{s} | \tilde{h})}{\partial \tilde{h}} \pi(\tilde{h}) + F(\hat{s} | \tilde{h}) \pi'(\tilde{h}). \quad (5)$$

<sup>47</sup>  $M$  consummates any proposed merger (with  $\pi(\cdot) \geq 0$ ) that  $A$  does not challenge.

<sup>48</sup> We assume  $\tilde{h} \in (h_r, \bar{h})$  to avoid the uninteresting and empirically irrelevant settings in which the merging parties always or never agree to implement the remedies  $A$  identifies.

<sup>49</sup> Equation (2) considers the case in which  $\pi(0) \geq 0$ , so  $M$ 's incremental profit from the modified merger as proposed by  $A$  (with  $h = 0$ ) is at least as great as the profit  $M$  would secure if it decided not to pursue the merger. If  $\pi(0) < 0$ , then  $M$  prefers to abandon the merger rather than proceed with the modified merger. In this case,  $\tilde{h}$  can be defined by  $B(\tilde{h}, \hat{s}) = 0$  and interpreted as the value of  $h$  at which  $M$  is indifferent between proceeding to court and abandoning the modified merger. More generally,  $\tilde{h}$  can be defined by  $B(\tilde{h}, \hat{s}) = \max \{ 0, \pi(0) \}$  and interpreted as the value of  $h$  at which  $M$  is indifferent between proceeding to court and either abandoning the modified merger or implementing the modified merger, whichever is more profitable. The key qualitative conclusions drawn below persist under this more general formulation. Merger abandonment is not modeled formally for expositional ease.

Equation (4) states that  $M$ 's expected benefit from proceeding to court ( $B(\cdot)$ ) declines as the court standard becomes more stringent (i.e., as  $\hat{s}$  declines), holding  $h$  constant. The more stringent (i.e., pro-enforcement) standard reduces the likelihood that  $M$  prevails in court, which reduces  $B(\cdot)$ .

Equation (5) indicates that changes in  $h$  have two effects on  $B(\cdot)$ . First, an increase in  $h$  reduces the likelihood that  $M$  prevails in court because court signals below  $\hat{s}$  become less likely. Second, if  $\pi'(h) > 0$ , an increase in  $h$  increases  $M$ 's profit from the merger (if approved). These two countervailing effects imply that, in principle,  $B(\cdot)$  can either increase or decrease as  $h$  increases.

The ensuing analysis focuses on the setting in which  $B(\cdot)$  increases with  $h$  (so  $\frac{\partial B(h, \hat{s})}{\partial h} > 0$  for all  $h \in [h, \bar{h}]$ ).<sup>50</sup> This setting prevails when, for example,  $M$ 's incremental profit from the merger is highly correlated with the social harm from the merger (so  $\pi'(h)$  is relatively large) and the outcomes of court proceedings exhibit considerable randomness (so  $\left| \frac{\partial F(\hat{s} | h)}{\partial h} \right|$  is relatively small). As  $h$  increases under these circumstances,  $M$ 's payoff when it prevails in court increases more rapidly than its probability of prevailing in court declines.<sup>51</sup> Consequently,  $M$ 's expected private benefit from proceeding to court increases as  $h$  increases.

To rule out the uninteresting (and empirically irrelevant) case in which no proposed merger ever proceeds to court, we assume  $B(\bar{h}, \hat{s}) > \pi(0)$ . This assumption simply states that for the most profitable potential merger,  $M$ 's expected private benefit from proceeding to court exceeds its profit from implementing the remedy.<sup>52</sup>

The timing in the model is as follows. After  $\hat{s}$  is established, parties to potential mergers learn

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<sup>50</sup> Macher, Mayo, Sappington and Whitener (2024) analyze the setting in which  $\frac{\partial B(h, \hat{s})}{\partial h} \leq 0$  for all  $h \in [h, \bar{h}]$ .  $M$  always implements the remedy and never proceeds to court in this (empirically irrelevant) setting. This conclusion reflects two facts. First,  $M$  secures private benefit  $\pi(0)$  if it accepts the proposed remedy rather than proceeding to court. Second,  $M$ 's expected benefit from proceeding to court when  $h = 0$  is  $\pi(0) - K_M$ . (Recall that  $M$  incurs court cost  $K_M > 0$  if it proceeds to court.) Therefore, if  $B(\cdot)$  declines as  $h$  increases,  $M$ 's expected benefit from proceeding to court when  $h > 0$  is less than  $\pi(0) - K_M$ , which is less than  $\pi(0)$ , the benefit that  $M$  can secure by accepting the proposed remedy rather than proceeding to court.

<sup>51</sup> This relationship will prevail when: (i) the harm ( $h$ ) from a merger is relatively highly correlated with the profitability of the merger; and (ii) the court signal is not extremely informative about  $h$ . This maintained assumption ensures that the proposed mergers that proceed to court are those for which  $M$  has the most to gain. If this assumption did not hold (e.g., if the court signal were extremely informative about  $h$ ), then  $M$ 's expected benefit from proceeding to court could decline with the profitability of the proposed merger. In this case,  $M$  would always implement the settlement, and would never proceed to court (as explained in [Macher, Mayo, Sappington and Whitener (2024)]). This outcome is not observed in practice.

<sup>52</sup> If  $B(\bar{h}, \hat{s}) < \pi(0)$ ,  $M$  accepts the proposed remedy for all  $h \in [h, \bar{h}]$ .

how profitable the mergers would be. Parties with profitable potential mergers ( $\pi(\cdot) \geq 0$ ) then announce their intention to merge. Next,  $A$  reviews the announced mergers and launches detailed investigations of those that would impose the most social harm ( $h$ ) if implemented as proposed, i.e., those with  $h > h_r$ .  $A$  declines to challenge mergers with  $h \leq h_r$ . For proposed mergers with  $h > h_r$ ,  $A$  identifies a remedy that would eliminate the social harm from the merger.  $A$  also signals its intention to challenge the merger in court if  $M$  does not implement the remedy. Next,  $M$  decides whether to implement the remedy (and thereby secure profit  $\pi(0)$ ) or proceed to court. Finally, if  $M$  proceeds to court, the court proceeding generates signal  $s$ . The merger is approved if  $s \leq \hat{s}$ . The merger is precluded if  $s > \hat{s}$ .

Because  $M$ 's expected private benefit from proceeding to court increases with  $h$ ,  $M$  proceeds to court rather than implement the remedy once  $h$  (and thus  $\pi(h)$ ) becomes sufficiently large that the expected payoff from proceeding to court outweighs the litigation costs ( $K_M$ ). This observation is stated formally in Finding 1.

**Finding 1.**  $M$  implements the remedy if  $h \in (h_r, \tilde{h}]$ .  $M$  proceeds to court if  $h \in (\tilde{h}, \bar{h}]$ .

Proof. Because  $M$ 's expected private benefit from proceeding to court increases as  $h$  increases, equations (1) and (2) imply:

$$\begin{aligned} B(h, \hat{s}) < B(\tilde{h}, \hat{s}) = \pi(0) & \text{ for } h \in (h_r, \tilde{h}) \text{ and} \\ B(h, \hat{s}) > B(\tilde{h}, \hat{s}) = \pi(0) & \text{ for } h \in (\tilde{h}, \bar{h}]. \end{aligned} \quad (6)$$

Equation (6) implies that  $M$ 's expected payoff is higher: (i) when it implements the remedy than when it proceeds to court if  $h \in (h_r, \tilde{h})$ ; and (ii) when it proceeds to court than when it implements the identified remedy if  $h \in (\tilde{h}, \bar{h}]$ . ■

We seek to determine how changes in the stringency of the court standard ( $\hat{s}$ ) affect the likelihood that  $M$  proceeds to court and the likelihood that  $M$  prevails in court. Finding 2 reports that  $M$  becomes less likely to proceed to court (i.e.,  $\tilde{h}$  increases) as the court standard becomes more stringent (i.e., as  $\hat{s}$  declines).

**Finding 2.**  $\frac{d\tilde{h}}{d\hat{s}} < 0$  for all  $\tilde{h} \in (\underline{h}, \bar{h})$ .

Proof. The conclusion follows directly from equations (3) and (4) because  $\frac{\partial B(h, \hat{s})}{\partial h} > 0$  for all  $h \in [\underline{h}, \bar{h}]$ . ■

Finding 2 holds because a more stringent (pro-enforcement) standard reduces the likelihood that  $M$  prevails in court, holding  $h$  constant. Therefore, as  $\hat{s}$  declines,  $M$  only proceeds to court if it anticipates a larger profit when it prevails in court.  $M$  anticipates a larger such profit when  $h$  (and thus  $\pi(h)$ ) increases.

Findings 1 and 2 imply that a more stringent (pro-enforcement) court standard has two effects. First, fewer proposed mergers proceed to court (because  $M$  proceeds to court only if  $h \in (\tilde{h}, \bar{h}]$  and  $\tilde{h}$  increases as  $\hat{s}$  declines). Second, the expected social harm from potential mergers that proceed to court increases (i.e.,  $E\{h \mid h \in (\tilde{h}, \bar{h}]\}$  increases as  $\hat{s}$  declines). This second effect arises because a more stringent court standard discourages  $M$  from proceeding to court unless the potential gain from prevailing in court is sufficiently pronounced. This potential gain ( $\pi(h)$ ) will be large precisely when the merger would cause substantial social harm. Therefore, as the court standard becomes more stringent, the expected social harm from proposed mergers that proceed to court increases.

Findings 1 and 2 also imply that a more stringent court standard can reduce the probability that  $M$  prevails in court for two reasons. First, holding  $h$  constant, the more stringent standard reduces the probability that a proposed merger is approved by the court. Second, the more stringent standard increases the expected social harm from proposed mergers that proceed to court. The increased expected harm also reduces the probability that a proposed merger is approved by the court. These observations (and Finding 2) underlie the following propositions, whose proofs are in the Appendix.

**Proposition 1.** *As the court standard becomes more (less) stringent, the probability that  $M$  accepts the identified remedy increases (decreases) when the impact of  $\hat{s}$  on  $g(\cdot)$  is sufficiently limited.*

**Proposition 2.** *As the court standard becomes more (less) stringent, the probability that  $M$  prevails in court decreases (increases) when the impact of  $\hat{s}$  on  $g(\cdot)$  is sufficiently limited.*

Qualitative conclusions that differ from those reported in Propositions 1 and 2 can arise if the impact of the prevailing court standard on the distribution of merger harm is sufficiently pronounced. In this event, a more stringent standard might substantially reduce the expected social harm from proposed mergers that proceed to court. The resulting increased likelihood that the court approves the proposed merger could decrease the probability that  $M$  accepts the identified remedy

and/or increase the probability that  $M$  prevails in court. The discussion in Section 4 explains why this theoretical possibility seems unlikely to prevail in our sample.

## 4. Empirical Estimation

### Data

Having explored the key channels through which judicial standards can affect observed merger challenges, settlement decisions and court outcomes, we next investigate empirically whether judicial standards have evolved. To do so, we first assemble data on the population of all mergers reported to the Agencies. These data are drawn from Annual Competition Reports (ACRs) produced by the Agencies pursuant to the Hart-Scott-Rodino Antitrust Improvement Act of 1976 (HSR).<sup>53</sup> The first ACR was published in 1977 but with limited data; more informative ACRs exist since 1982. The ACRs provide aggregated data on HSR merger filings, from which we are able to extract a number of salient variables. We construct a measure (*HSR MERGERS*) of the annual number of reported HSR mergers. Firms reported 84,985 HSR mergers over 1982-2021, with substantial year-by-year heterogeneity as depicted in Figure 2. Large reductions in reported HSR mergers appear mainly driven by economic recessions.

--- Insert Figure 2 Here ---

The ACRs also categorize mergers on distinct dimensions: i.e., intra-industry (horizontal) transactions; size of transaction; and size of assets and sales of the acquirer and acquiree. We employ this detail to construct a measure (*HM PCT*) that represents the ratio of intra-industry transactions to total transactions. This measure allows us to examine whether Agency challenge, trial and outcome decisions are affected by the prevalence of horizontal mergers that can shape industry consolidation. Figure 3 indicates that the percentage of intra-industry (horizontal) mergers peaked in the mid- to late-1990s and has fallen significantly since. Only four percent of all reported HSR mergers were categorized as intra-industry in 2021.

--- Insert Figure 3 Here ---

We also construct a measure (*LM PCT*) of the ratio of the number of transactions that exceed \$1 billion to the total number of transactions to capture the potential that Agency challenge

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<sup>53</sup> These Annual Reports are available at: <https://www.ftc.gov/policy/reports/policy-reports/annual-competition-reports>. Some categorical data (e.g., asset transaction, acquirer and acquiree sizes) are missing in the 1986 ACR.

decisions are influenced by the presence of “large” mergers. Figure 4 indicates that the percentage of transactions that exceed \$1 billion has generally increased over the sample timeframe. However, meaningful increases and decreases in this percentage are observed in particular years.

--- Insert Figure 4 Here ---

The ACRs also describe the merger enforcement activities of the Agencies. In particular, data on formal complaints filed and preliminary injunctions, agencies’ declarations of intentions to challenge mergers, and agencies’ filings of consent decrees that reflect adjustments designed to remove anticompetitive concerns regarding as-proposed mergers—more indirect manifestations of merger enforcement—are included.<sup>54</sup> We first aggregate these formal and informal complaints into a measure of the annual number of merger enforcement challenges (*CHALLENGES*). Over 1982-2021, the Agencies challenged 1,477 of the 84,985 HSR mergers. We then construct an annual merger challenge rate measure (*MC RATE*) that represents the ratio of Agency challenges to reported HSR mergers. Figure 5 indicates that, following initial declines in the 1980s, the merger challenge rate has increased from less than one percent in the late-1980s to more than two percent in more recent years.

--- Insert Figure 5 Here ---

We also use the ACRs to identify whether challenged mergers are fully litigated. Merging parties resolve challenges either by: (1) restructuring the merger to eliminate the competitive concerns; or (2) abandoning the merger altogether. Settlements constitute the vast majority of all challenges: approximately 93 percent of the challenges were resolved or abandoned over the sample period. We construct annual measures of the number of litigated cases (*LC NUM*) and the litigated case rate (*LC RATE*), which represents the ratio of the number of litigated cases to the

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<sup>54</sup> This approach is consistent with the Baker and Shapiro (2008) enforcement action measure which includes “court cases, consent settlements, and transactions abandoned or restructured prior to filing a complaint as a result of an announced challenge” (p. 245). Our measure is also akin to the Leary (2002) merger enforcement intensity measure, although the author’s narrative description indicates that post-second request merger abandonments are included as an indicator of merger challenges. We more conservatively exclude post-second request merger challenge abandonments in our measure for two reasons. First, such abandonments can occur for reasons other than merger challenges. For example, Coate (2018) indicates that “[n]ot all matters [are] withdrawn from review due to antitrust concerns, as any other impediment to the transaction can force the withdrawal decision. Examples include an inability to obtain other regulatory approvals, losing a bidding war for the target, or failure to obtain financing. Antitrust concerns appear to be the most likely reason for abandonment, although non-antitrust concerns regularly lead to the abandonment of the merger” (p. 4). Second, as a practical matter, the annual reports do not consistently provide data on the number of mergers abandoned in the wake of second requests by the Agencies.

number of Agency challenges. Figure 6 indicates that the litigated case rate by decade has decreased markedly: from roughly 14 percent over 1980-1989 to between four and five percent in subsequent decades.

--- Insert Figure 6 Here ---

We also use the ACRs to identify both the population and the outcomes of all fully-litigated mergers. In instances where complete information is not available in the ACRs, we use the Westlaw database to determine the litigation outcome. We review each case to ensure that it was fully litigated and judged on the antitrust merits. To be considered “fully litigated,” a Federal District or Appellate Court must have evaluated the challenge and rendered a verdict. We do not include challenges where the court only issued a final judgment indicating that a settlement was reached by the parties.

We identify 86 unique mergers litigated by the DOJ or the FTC that meet these criteria over 1982-2021. For each litigated merger, we record the fiscal year (*FISC YEAR*) in which the merger was officially challenged by the Agencies; the decision year (*DEC YEAR*) in which the case completed; the case name (e.g., “Federal Trade Competition v. The Coca-Cola Co.”); the agency involved (*FTC* or *DOJ*); the judges involved; and the trial outcome (i.e., *TRIAL WON* is one if the Agency prevailed at trial and is zero otherwise).

Most of the litigated mergers were decided at the District Court level. However, some were ultimately decided by an Appeals Court and one was decided by the Supreme Court. In those instances, we use the highest court that decided the litigated case on the merits for purposes of determining which party won the case. Appeals that were remanded back to a lower court for a decision on the merits or appeals that only determined the court’s own jurisdiction are not considered. We also do not include proceedings that are entirely contained within the FTC’s administrative procedures (i.e., trials in front of an administrative law judge and appeals to the full FTC heard by the FTC Commissioners) that are not appealed to a Circuit Court. We include both preliminary injunction hearings and trials on the merits. We do not include the issuance of a temporary restraining order because such issuances typically are far less burdensome for the government to secure.

Figure 7 shows the percentage by decade of fully-litigated merger cases won by the Agencies, categorized by case decision year. The Agency win rate has increased markedly: from 34.6 percent during 1990-1999 to 71.4 percent during 2000-2009 to 81.0 percent during 2010-2019. The current



decade (viz. 2020-2021) reflects only two years of information (i.e., five trials) and is color-coded to denote its small sample size.

--- Insert Figure 7 Here ---

All U.S. federal judges are appointed by the President and confirmed by the Senate. To account for the possibility that judge ideology might independently influence merger trial outcomes, we collect data on the political party of the President who appointed each judge that rendered one or more merger decisions.<sup>55</sup> These data are drawn from the Federal Judicial Center's Biographical Directory of Article III Federal Judges.<sup>56</sup> *COURT DEM* is an indicator variable that equals one if the judge writing the opinion for the merger trial decision was appointed by a Democratic President and is zero otherwise. Where there are multiple judges (appellate decisions), the party of the President that appointed the judges issuing the majority opinion is listed (regardless of whether the opinion was written by a judge appointed by a Republican or Democrat president).

Per our theoretical model, we collect data on the annual budgets of the Antitrust Division of the DOJ and FTC to control for any binding resource constraint.<sup>57</sup> We aggregate these data into a single measure (*BUDGET*) and adjust it for inflation using the Consumer Price Index.

Finally, we incorporate the potential influence of each presidential administration, utilizing a set of indicator variables in the estimation. Leary (2002) and Baker and Shapiro (2008) argue that it takes time for a new administration to put its political leadership team in place at the Agencies. We follow their approach and record each administration as beginning one year after its formal start date and ending one year after its official end date.

## Descriptive Statistics

Table 1 provides descriptive statistics at the fiscal year-level over 1982-2021. The number of mergers that meet HSR reporting requirements ranges from 716 to 4,926, with an average of roughly 2,100 per fiscal year. The average percentage of horizontal mergers is around 40 percent, but this measure exhibits substantial heterogeneity over the fiscal years. The average percentage of large mergers (i.e., transactions exceeding \$1 billion) is eight percent, but varies widely over

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<sup>55</sup> This baseline measure follows the standard approach for capturing judicial ideology (Goldman, 1999). More recently, alternative measures of judicial ideology have been developed. See Bonica and Sen (2021).

<sup>56</sup> See <https://www.fjc.gov/history/judges>.

<sup>57</sup> Appropriation data for the DOJ are found at <https://www.justice.gov/atr/appropriation-figures-antitrust-division>. Similar appropriation data for the FTC are found at <https://www.ftc.gov/about-ftc/bureaus-offices/office-executive-director/financial-management-office/ftc-appropriation>.

the sample timeframe. The Agencies collectively challenge about 37 mergers per fiscal year on average. As is apparent from this statistic and as shown in Figure 5, the number of Agency challenges is small relative to the number of reported HSR mergers. Of these Agency challenges, slightly more than two per year on average (roughly eight percent) are fully litigated. Inflation-adjusted agency budgets average more than \$380 million over the sample period.

--- Insert Table 1 Here ---

Table 2 provides correlation statistics at the fiscal year-level. Reported HSR mergers and fiscal year are relatively uncorrelated. Agency challenges (*CHALLENGES*) of HSR mergers and the merger challenge rate (*MC RATE*) are positively correlated with fiscal year, while fully-litigated cases (*LIT CASES*) and the litigated case rate (*LC RATE*) are negatively correlated. The percentage of transactions exceeding \$1 billion (*LM PCT*) and Agency budgets (*BUDGET*) increase over fiscal years, while the percentage of horizontal mergers (*HM PCT*) declines over fiscal years.

--- Insert Table 2 Here ---

Table 3 provides descriptive statistics of the set of trials that are fully-litigated over 1982-2021. The FTC handles nearly two-thirds of fully-litigated cases. Each administration undertook a sizable fraction of fully-litigated trials: from 9 percent for the Trump administration to 27 percent for the Reagan administration. The Agencies win 59 percent of the fully-litigated trials. A Democrat-appointed judge presided in 38 percent of the trials.

--- Insert Table 3 Here ---

Table 4 provides correlation statistics for the fully-litigated trials. The likelihood of an Agency prevailing at trial increases over time and generally exhibits increasing positive correlation across successive administrations. There is a positive correlation between the FTC's involvement and a win for the Agencies.

--- Insert Table 4 Here ---

The descriptive and correlation statistics reflect general patterns of potential interest, but do not fully address the subtleties highlighted in our theoretical model. We thus turn to an empirical analysis that examines the evolution of judicial standards in more detail.

## Empirical Specification

In principle, our propositions could be tested through structural estimation of  $\hat{\delta}$ , or by exploiting observed cross-sectional or time-varying features and variations of observed data. Our focus on inter-temporal variations in litigated cases and the corresponding trial outcomes is dictated by data availability. Proposition 1 indicates that variations in the likelihood that challenged mergers proceed to trial can be indicative of shifting judicial standards. Proposition 2 indicates that changes in the likelihood that Agencies prevail in court also can reflect shifts in judicial standards. Together, these propositions suggest that observed intertemporal variations in settlements and trial outcomes can provide a window into whether and how judicial standards have evolved. The data assembled allow us to examine the evolution of proposed mergers, Agency challenges, decisions to litigate or settle challenges, and trial outcomes.

Specifically, our empirical analysis examines whether reported HSR mergers were challenged or not challenged (first stage), whether challenges proceeded to trial or were settled (second stage), and whether fully-litigated trials were won or lost by the Agencies (third stage). We examine these stages by working backward. Our third-stage estimation predicts whether Agencies prevail in court using the set of fully-litigated trials (*viz.*, the “outcome” sample)—*i.e.*, those trials that are won or lost by the Agencies. Our second-stage estimation predicts whether an Agency challenge proceeds to trial using the set of all merger challenges (*viz.*, the “trial” sample)—*i.e.*, those challenges that proceed to trial and those that settle.<sup>58</sup> Our first-stage estimation predicts whether a reported HSR merger is challenged using all reported HSR mergers (*viz.*, the “challenge” sample)—*i.e.*, those mergers that are challenged and those that are not challenged.<sup>59</sup>

From 86 observed outcomes in the trial sample, the dataset thus expands twice. It first expands to the 1,477 observations in the challenge sample, representing the 86 challenges that went to trial and the 1,391 challenges that were settled. It then expands to the 77,308 observations in the merger sample, representing the 1,477 reported HSR mergers that were challenged and the 75,831 reported HSR mergers that were not challenged.<sup>60</sup>

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<sup>58</sup> For example, in 1990, the Agencies challenged 34 HSR mergers and 6 of these challenges proceeded to trial. The data are expanded for this year by the difference between the number of HSR mergers that were challenged and the number of HSR mergers that were fully litigated (28 additional observations).

<sup>59</sup> For example, in 1990, 2,262 HSR mergers were reported and 34 of these were challenged by the Agencies. The data are expanded for this year by the difference between the number of HSR mergers reported and the number of HSR mergers challenged (2,228 additional observations).

<sup>60</sup> This number differs from the 84,985 reported mergers due to missing transaction size data in the 2006 ACR.

We employ three dichotomous dependent variables.  $CH\_DV$  is one if the merger is challenged by the Agencies and is zero otherwise.  $TR\_DV$  is one if the challenge proceeds to a fully-litigated trial and is zero otherwise.  $OUT\_DV$  is one if the Agency prevails in the fully-litigated trial and is zero otherwise. Our specification thus entails three equations:

$$y_1^* = x_1\beta + \mu_1; \quad y_1 = 1 \text{ if } y_1^* > 0; \quad y_1 = 0 \text{ otherwise.} \quad (9)$$

$$y_2^* = x_2\gamma + \mu_2; \quad y_2 = 1 \text{ if } y_2^* > 0; \quad y_2 = 0 \text{ otherwise.} \quad (10)$$

$$y_3^* = x_3\delta + \mu_3; \quad y_3 = 1 \text{ if } y_3^* > 0; \quad y_3 = 0 \text{ otherwise.} \quad (11)$$

In equations (9) – (11),  $y_1^* = CH_{DV}$ ,  $y_2^* = TR_{DV}$ , and  $y_3^* = OUT_{DV}$ ;  $\beta$ ,  $\gamma$ , and  $\delta$  represent parameters to be estimated;  $x_1$ ,  $x_2$ , and  $x_3$  are vectors of exogenous explanatory variables; and  $\mu_1$ ,  $\mu_2$ , and  $\mu_3$  are random error terms. We additionally specify that:

$$\begin{aligned} E[\mu_1|x_1, x_2, x_3] &= E[\mu_2|x_1, x_2, x_3] = E[\mu_3|x_1, x_2, x_3] = 0; \\ Var[\mu_1|x_1, x_2, x_3] &= Var[\mu_2|x_1, x_2, x_3] = Var[\mu_3|x_1, x_2, x_3] = 1; \\ \text{and } Cov[\mu_1, \mu_2, \mu_3|x_1, x_2, x_3] &= \rho \end{aligned} \quad (12)$$

where  $E[\cdot]$  is the expectations operator and  $Var[\cdot]$  and  $Cov[\cdot]$  represent the variance and covariance, respectively.

Because each of the dependent variables in equations (9) – (11) is dichotomous, probit (or logit) might appear to be sensible estimation approaches. These equations could conceivably be estimated separately. However, the set of Agency challenges and the set of fully-litigated trials may not constitute random samples of, respectively, all HSR mergers and all Agency challenges. Consequently, separate equation estimation could produce biased parameter estimates. Equations (9) – (11) are instead structured as a system and solved simultaneously using trivariate probit with double sample selection. We jointly estimate the system of equations (including the selection process) using Roodman's (2011) conditional mixed-process (cmp) regression procedure. This procedure allows simultaneous estimation of the three equations and employs a simulated maximum likelihood algorithm (Geweke, 1989; Hajivassiliou and McFadden, 1998; Keane, 1994) to directly estimate the cumulative higher-order likelihood function.

We are limited in the availability of detailed data at each estimation stage. In particular, we do not possess information on each reported HSR merger or on specific Agency challenge decisions,

such as the firms involved, the transaction parameters, and the industry classification. Most data are available only at a highly-aggregated, annual basis. We nevertheless attempt to utilize measures that might meaningfully affect the decisions and outcomes at each particular stage.

In the first-stage (challenge) estimation, we consider whether merger challenges are affected by the (logged) size of Agency budgets (*BUDGET*) and the (logged) number of merger filings (*HSR*)—both of which might affect Agency workloads and thereby influence the Agency’s propensity to challenge. We control for the annual percentage of horizontal mergers (*HM PCT*) and large mergers (*LM PCT*) reported, which could also impact Agency challenge decisions. Finally, we control for a 2000 Amendment to the HSR Act that raised the transaction size filing threshold. This amendment subsequently reduced the number of HSR filings and likely impacted the Agency by increasing (decreasing) resources dedicated to larger (smaller) mergers. It is not apparent *a priori* how these changes affect the Agency’s propensity to challenge mergers. We nevertheless control for the potential effects using *HSR AMENDMENT*, an indicator variable equal to one for all post-2000 fiscal years and zero otherwise.

In the second-stage (trial) estimation, we examine the time-varying propensity of the parties to proceed to litigation. Our baseline estimation considers the fiscal year in which a case proceeds to trial (*FISCAL YEAR*); a second estimation uses a set of indicator variables for each presidential administration in our sample. The base category is the Reagan administration. We also control for the annual percentage of horizontal mergers (*HM PCT*), as trial and settlement decisions might be influenced by intra-industry consolidation. We also control for the total number of Agency challenges (*CHALLENGES*), which might influence the likelihood that cases proceed to trial. Finally, we control for whether any idiosyncratic Agency differences (e.g., historical precedent, particular industry, etc.) might affect the propensity to proceed to fully-litigated trial: *FTC* is an indicator variable equal to one if the FTC litigates the merger and zero if the DOJ litigates the merger.<sup>61</sup>

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<sup>61</sup> Additional empirical variables suggested by the theoretical literature proved infeasible to employ as controls. For example, Waldfoegel (1995) identifies the degree of uncertainty and trial costs that litigants face, as well as the prospective monetary judgment upon victory at trial, as theoretical determinants of whether private parties in civil litigation proceed to trial. As he observes, however, direct data on the uncertainty facing the respective litigants is “difficult to obtain” (p. 458). For a large set of civil cases filed in the Southern District of New York, he proxies such uncertainty by the fraction of pro se plaintiffs, the tendency for litigation parties to be repeat players, and the fraction of institutional rather than individual litigants. These variables are not applicable in our antitrust setting. Waldfoegel observes that data on litigation costs “are not available” (p. 462). This is also true in our context. Similarly, the magnitude of a monetary judgment is inapplicable in our empirical setting.

In the third-stage (outcome) estimation, we examine the propensity for the Agency to win the fully-litigated trial using a time trend based on decision year (*DEC YEAR*). We also control for the annual percentage of horizontal mergers, as trial outcomes might be affected by industry consolidation. We further control for the political party of the president who appointed the presiding judge or judges issuing the majority opinion (*COURT DEM*) in the trial. This measure helps determine whether the courts—potentially influenced by the Reagan-era emergence of the Chicago School—have imposed increasingly lax standards for approving litigated mergers. Finally, we control for court location (subject to sample size constraints): *DC CIRCUIT* is an indicator variable equal to one if the trial occurs in the DC Circuit Court and zero otherwise.

### Empirical Results

Table 5 provides the estimation results. Coefficient estimates and standard errors are reported for each variable. Standard errors are robust and clustered (by *FISC YEAR*). The coefficients in Model 1 and 2 are identical in the first and third stages, but vary in the use of fiscal year (in Model 1) and administration (Model 2) in the second stage. The trivariate probit estimation provides correlations among the error terms in the three equations. We report Fischer's z transformations of rho ( $\rho$ ) via the  $\text{atanhrho}$  statistics, which indicate moderate to significant correlation across all three stages, i.e., between the challenge and trial stages, the trial and outcome stages, and the challenge and outcome stages.

--- Insert Table 5 Here ---

The first-stage results indicate that the probability a reported HSR merger is challenged increases with the (logged) Agency budget ( $\rho < .001$ ). In contrast, the probability that a HSR merger is challenged declines as the (logged) number of reported HSR mergers increases ( $\rho < .05$ ). These results suggest that the Agencies are more likely to challenge when resources are more readily available and relatively less constrained. The first-stage results also indicate that the percentage of horizontal mergers ( $\rho < .001$ ) increases the likelihood that Agencies challenge—a result consistent with heightened concerns with intra-industry mergers. Finally, the number of challenges declines with the post-2000 amendment reductions in HSR reported mergers.

The second-stage results indicate a statistically significant reduction in the probability that challenged mergers proceed to trial over time—via Model 1 using fiscal year ( $\rho < .001$ )—and over successive presidential administrations—via Model 2 using administration dummies ( $\rho < .01$  for

Clinton onwards). These findings support the premise that judicial standards have changed over time. Proposition 1 implies that these findings are consistent with a shift toward more pro-enforcement judicial standards over time (or successive administrations), assuming the impact of changing judicial standards on the sample distribution of harm from mergers is limited. The second-stage results also indicate that a greater percentage of horizontal mergers decreases the propensity of fully-litigated trials ( $\rho < .01$  in Model 1), while FTC engagement (vis-à-vis DOJ engagement) increases the propensity of fully-litigated trials ( $\rho < .01$ ).<sup>62</sup>

The third-stage results indicate a statistically significant propensity for the Agencies to prevail in fully-litigated mergers over time using *DEC YEAR* ( $\rho < .10$ )—a result that is consistent with changing judicial merger standards. Proposition 2 implies that the increasing probability of an Agency win at trial is consistent with the judiciary adopting more stringent standards for merger approval if the impact of changing judicial standards on the sample distribution of harm from mergers is sufficiently limited. The third-stage results also indicate that the annual percentage of horizontal mergers does not impact fully-litigated trial outcomes. The third-stage results also show no statistical indication that judges appointed in Democratic administrations are more or less pro-enforcement than are Republican-appointed judges in trial outcomes. That is, the party of the president that appointed federal judges to the bench does not appear to influence the outcome of fully-litigated merger trials.<sup>63</sup> The third-stage results also provide no indication that trials held in the D.C. Circuit have systematically different litigation outcomes than trials held in other courts.

In summary, we find evidence of a decreasing propensity for challenged mergers to proceed to trial and an increasing propensity for Agencies to prevail in court over the sample timeframe. These findings are consistent with the predictions of Propositions 1 and 2 when the *distribution modification effect* (i.e., the impact of the court standard,  $\hat{s}$ , on the density of harm,  $g(h | \hat{s})$ ) is sufficiently limited. In this case, as the standard becomes more stringent, the probability that M

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<sup>62</sup> Detailed investigation of DOJ and FTC litigation rates is beyond the scope of this paper, but it is possible that differences may stem from the heterogeneous litigation costs imposed by the dissimilar litigation paths incurred by these Agencies. It is also possible that these structural differences in the litigation process may lead to nuanced differences in litigated outcomes.

<sup>63</sup> This finding does not support the narrative that changes in the composition of judges hearing merger cases have systematically altered judicial outcomes, but it is consistent with earlier empirical analysis of litigated outcomes in other contexts. See, e.g., Ashenfelter, Eisenberg and Schwab (1995) who reach a similar conclusion in an extensive study of federal civil rights and prisoner cases.

accepts the identified remedy increases in part because the probability that M prevails in court declines.<sup>64</sup>

As the discussion that follows Propositions 1 and 2 explains, our model can generate different qualitative conclusions (and different interpretations of our empirical results) if the distribution modification effect is sufficiently pronounced. In this case, a less stringent court standard could substantially increase the expected harm from proposed mergers and thereby: (i) increase the probability that M accepts the identified remedy (because the likelihood of prevailing in court is relatively low); and/or (ii) reduce the probability that M prevails in court (reflecting the increased incidence of mergers with relatively high levels of harm in the population). Therefore, in principle, our empirical findings could be consistent with a judicial standard that has become less stringent over time.

Data that would definitively characterize the exact nature and extent of the distribution modification effect are not available. However, our data provide some evidence that it is unlikely that the judicial standard has become less stringent and substantially increased the expected harm from mergers in our sample. If this were the case, we would expect to see the ratio of relatively problematic (horizontal) to less problematic (nonhorizontal) proposed mergers increase over time. In fact, this ratio diminishes over time in substantial portions of our sample (recall Figure 3). Although this fact does not categorically exclude the possibility that the judicial standard has become less stringent and substantially increased the expected harm from proposed mergers over time, it does provide *prima facie* evidence that is inconsistent with this possibility.<sup>65, 66</sup>

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<sup>64</sup> As suggested in Section 2, the mechanism by which an increasingly pro-enforcement judicial standard regarding mergers may have arisen likely rests on the interplay between a growing set of analytical Agency tools upon which the judiciary increasingly relies and a growing body of pro-enforcement judicial precedents.

<sup>65</sup> Mayo, Macher, and Whitener (2023) report that more than 89 percent of all mergers proposed between 2001 and 2020 raised such minimal competitive concerns that they were allowed to proceed without a formal review by either Agency. This finding suggests that any change in judicial standard that might have occurred during this period did not have a material impact on a substantial portion of the distribution of harm from proposed mergers. The authors also find that the intertemporal path of the share of mergers deemed worthy of an Agency review generally exhibited a non-increasing trend during the sample period, thereby providing no evidence of an increasing density of mergers with relatively pronounced anticompetitive harm.

<sup>66</sup> Recent surveys suggest that the number and nature of proposed mergers may not be very sensitive to perceived changes in antitrust enforcement. Sokol, Ginn, Calzaretta and Santana (2023) survey practitioners regarding the impact of Biden Administration antitrust enforcement policies on merger activity, and report that “Some practitioners observed that companies are more concerned about exposure and more deals are falling apart, while other practitioners said companies are not abandoning deals just because of the agencies’ current investigative practices and rhetoric” (pp. 1118-9). The authors also suggest that despite “perceived increased scrutiny” by antitrust officials, “the counsel provided by economists and empirical consultants does not appear to have changed”



## Robustness Results

We undertake several empirical robustness tests to better establish the integrity of our findings. We find that our results are robust to alternative estimation approaches. Single-stage (e.g., univariate probit) models or two-stage (e.g., bivariate probit) models provide qualitatively similar results. Estimations using continuous dependent variables (i.e., linear probability models) in some or all stages also produce results that are qualitatively similar.

We next consider the use of alternative variables in particular stages. The results are robust to the replacement of Agency budget with administration dummy variables in the first-stage (challenge) estimation. Table 5 shows the results are robust to the replacement of fiscal year with administration in the second-stage (trial) estimation. Additionally, the results are robust to the replacement of decision year with fiscal year in the third-stage (outcome) estimation.

We next consider the inclusion of additional variables in the first-stage (challenge) estimation. The results are robust to the inclusion of (logged) FTC full-time employee (FTE) counts.<sup>67</sup> We next consider whether specific macroeconomic indicators might affect the probability that the Agencies challenge a proposed merger. The resulting estimations are robust to the inclusion of common macroeconomic controls (e.g., national unemployment rate, GDP price index, real (logged) corporate profits, and Conference Board consumer confidence) in separate first-stage estimations. None of these variables materially affects the results reported in Table 5.

As a final robustness test, we replace our baseline measure of judicial ideology (viz., the political party of the president who nominated the judge or judges issuing the majority opinion) with a measure of judicial ideology developed and subsequently refined by Giles, Hettinger and Peppers (2001) and Epstein, Martin, Segal and Westerland (2007) that incorporate, *inter alia*, the role of “senatorial courtesy” in the assignment of judges’ ideological scores.<sup>68</sup> These scores are publicly available for federal district court judges,<sup>69</sup> and for appeals court and Supreme Court judges.<sup>70</sup> To

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(p. 1117). To the extent that changes in antitrust enforcement policies and changes in antitrust judicial standards have similar effects of the distribution of harm from proposed mergers, these survey findings suggest that the distribution modification effect may be limited.

<sup>67</sup> Department of Justice (Antitrust Division) full-time employee data are not available.

<sup>68</sup> See Bailey (2017) for a discussion of “senatorial preference.”

<sup>69</sup> These data are provided by Christine Boyd and are available at: <https://www.dropbox.com/s/6rbrq0wh1a3bow1/Federal%20District%20Court%20Judge%20Ideology%20Data%20Details%20with%20Links.pdf?dl=0>

<sup>70</sup> These data are provided by Lee Epstein and are available at <https://epstein.usc.edu/jcs>.

account for the prevailing judicial ideology in merger trials that involved a panel of judges (the appeals court and the Supreme Court), we alternatively employed the median and mean ideological scores of the panel of judges. Inclusion of these novel judicial ideological scores do not alter our baseline estimates in any meaningful manner. Notably, consistent with our baseline estimates, these alternative measures do not reveal any indication that judicial ideology is an important determinant of merger trial outcomes.

### Limitations

There are some limitations of our analysis that future research might address. On the theoretical side, we note four elements of our model that do not fully reflect actual practice. First, although we have sought to capture the essential elements of the merger review and evaluation process through a three-stage model and estimation, our model sets aside nuanced elements of this process that may warrant future exploration. For example, the initial pre-merger notification materials submitted under HSR are subject to a preliminary screening and accompanying decisions by the Agencies on whether to subject the proposed merger to more detailed scrutiny.<sup>71</sup> An expanded model may incorporate this initial decision by the Agencies. Second, the model implicitly assumes that all HSR merger notices arrive simultaneously, with the Agencies rank ordering all potential mergers according to their social harm before deciding which proposed mergers to examine in more detail. In practice, mergers are reported throughout the year and are addressed serially. Third, the model presumes a relatively simple remedy process: viz., the Agencies proffer remedies and merging firms either accept or reject the single proposed remedy. In practice, the remedy process can entail negotiation, with merging firms sometimes offering settlement terms that render an otherwise objectionable merger acceptable to the Agencies. The model also assumes that the Agencies design remedies to fully eliminate anticompetitive harm. In practice, this may not always be the case because a proposed merger might offer other benefits (such as the prospect of increased innovation or enhanced product quality). Fourth, the model assumes that the Agencies accurately discern the level of anticompetitive harm each proposed merger would cause if it were to be implemented without mitigation. In practice, antitrust agencies typically face some uncertainty in this regard. The signal generated in court can provide additional information about the social harm a proposed merger would impose in the presence of such uncertainty. An expanded theoretical

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<sup>71</sup> See Mayo, Press and Whitener (2023) for a detailed discussion of this early-stage merger review step.

model that included all these features would entail considerable analytic complexity, seemingly without fundamentally altering the key qualitative effects that arise in our streamlined analysis. Nevertheless, future research that incorporates additional elements of actual merger enforcement policy would be valuable.

On the empirical side, we have sought to extract as much data as possible to estimate the various interrelated stages of merger review and litigation. Our sample period (1982-2021) includes all HSR reported mergers, challenges, and trial outcomes. We believe that the resulting database is the most comprehensive collection of mergers, challenges, and trial outcomes ever assembled. That said, populating the challenge, trial, and outcome equations is necessarily limited by the highly aggregated data that are available. More granular data that include detailed characteristics of the merging firms and the markets in which they compete would improve the specification and allow for greater precision in estimating each stage: in particular, in determining the extent to which shifting judicial standards have changed over time. If, and as, these data become available, future research will be able to move beyond the initial insights we have provided. Similarly, our research is limited by the scarcity of commonly-accepted determinants of settlements and trial outcomes in the specific context of merger enforcement. As research identifies these factors, they can be incorporated into the framework we have provided to enhance confidence in the interpretations ascribed to the temporal trends. Finally, as seen in Section 2, the institutional features and processes of merger enforcement differ between the DOJ and the FTC. These differences potentially may affect the challenge and litigate decisions adopted by these enforcement agencies, and, in turn, affect observed trial outcomes. Data constraints prohibit us from incorporating these differences. As data reporting evolves, this constraint may ease and prove to be a fruitful path for additional insights.

## 5. Conclusion

The prosecution of merger challenges and judicial assessments of these challenges have long been sources of controversy in antitrust enforcement circles. Too often, however, inferences regarding the judicial standards that are applied to merger challenges have been drawn from limited data and casual observations rather than systematic analyses. In this vein, a narrative has developed that—in the wake of the rise of the Chicago School—the judiciary has grown increasingly lax, with Agencies facing increasing burdens in court to challenge mergers successfully.

We attempt to provide a more systematic assessment of whether judicial merger standards have shifted in recent decades. To do so, we adapt popular settlement models to account for key elements of the merger review and litigation processes, including merger remedies. Our model predicts that, under conditions that seem likely to hold in practice, the court standard for approving a merger becomes more (less) stringent as: (i) the probability that merging parties accept a merger remedy (rather than proceed to trial) increases (decreases); and (2) the probability that merging parties prevail in court decreases (increases).

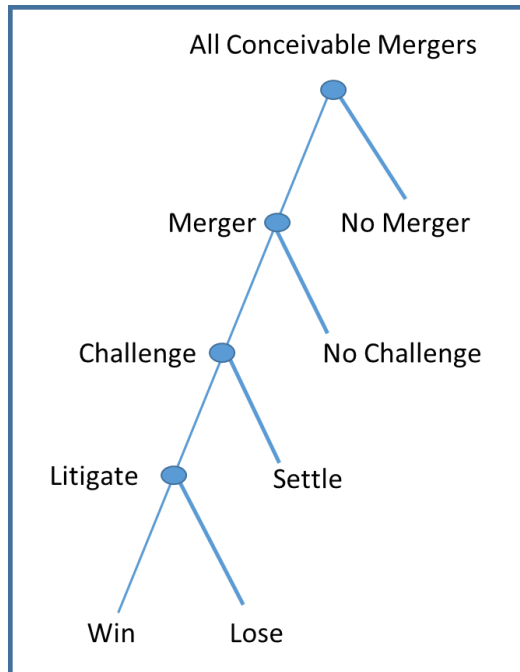
We undertake an empirical analysis that employs the population of all mergers reported to the Agencies over 1982-2021. These data include 77,308 HSR mergers that are reported to the Agencies, of which 1,477 were challenged and 86 proceeded to trial and were adjudicated. Given the presence of potential selection effects in the three stages of our analysis—i.e., the Agencies’ challenge decision, the potential merging parties’ litigate or settle decision, and the court’s outcome decision—we employ a trivariate probit model with double sample selection for estimation. We find evidence that merging parties have become less likely to proceed to court and less likely to prevail in court over the sample period. These findings suggest that, contrary to the narrative of an increasingly lax judiciary, judicial merger standards have become more stringent (pro-enforcement) over the past four decades.

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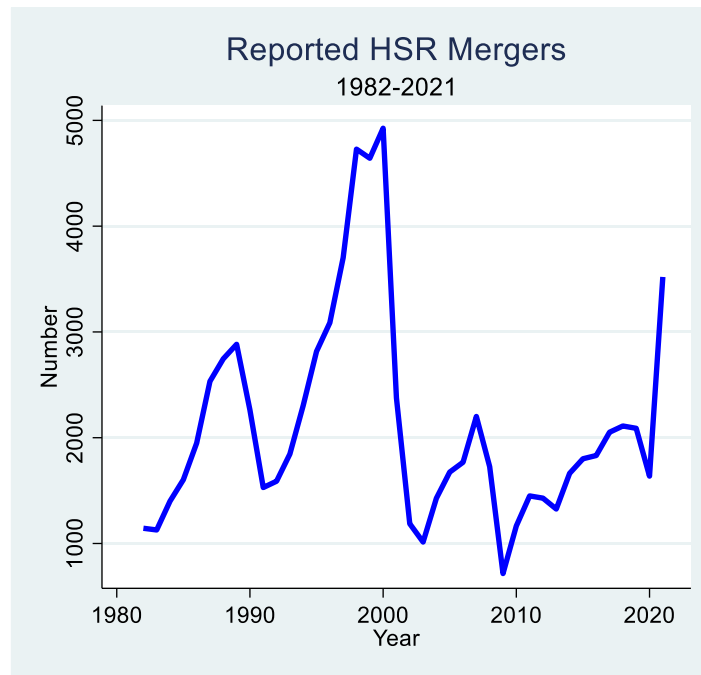
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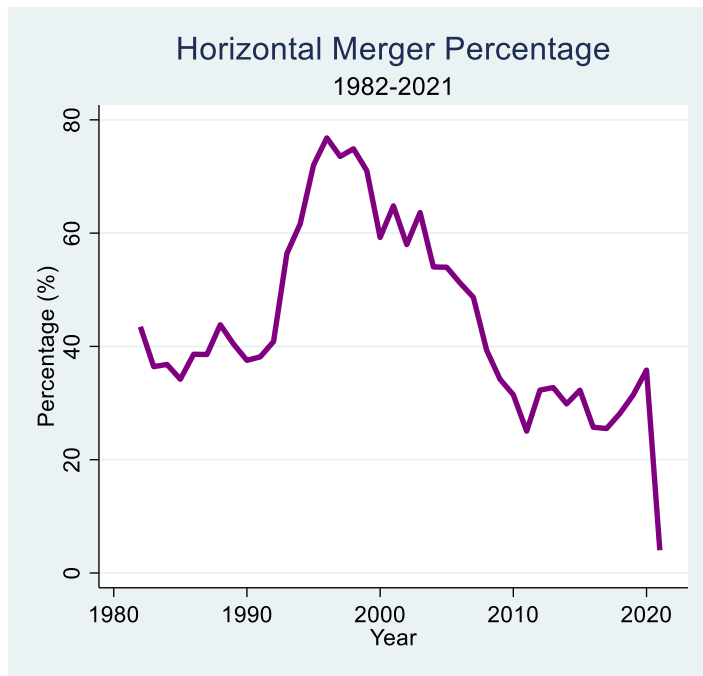
**Figure 1 – Antecedents to Outcomes of Litigated Merger Challenges**



**Figure 2 – Reported HSR Mergers**

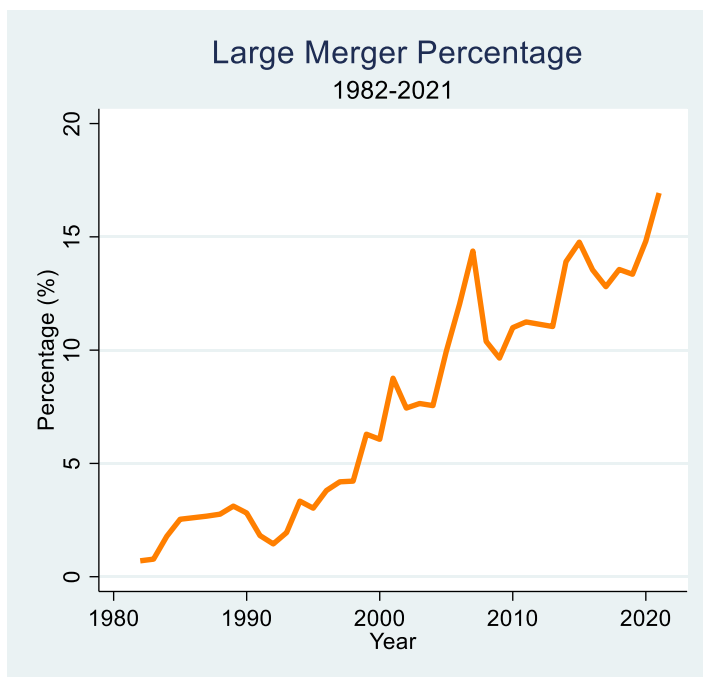
Notes: This figure shows the annual number of reported HSR mergers. It uses information in the FTC and Department of Justice Annual Competition Reports. The HSR merger data used are over 1982-2021. The fiscal year is reported on the horizontal axis.





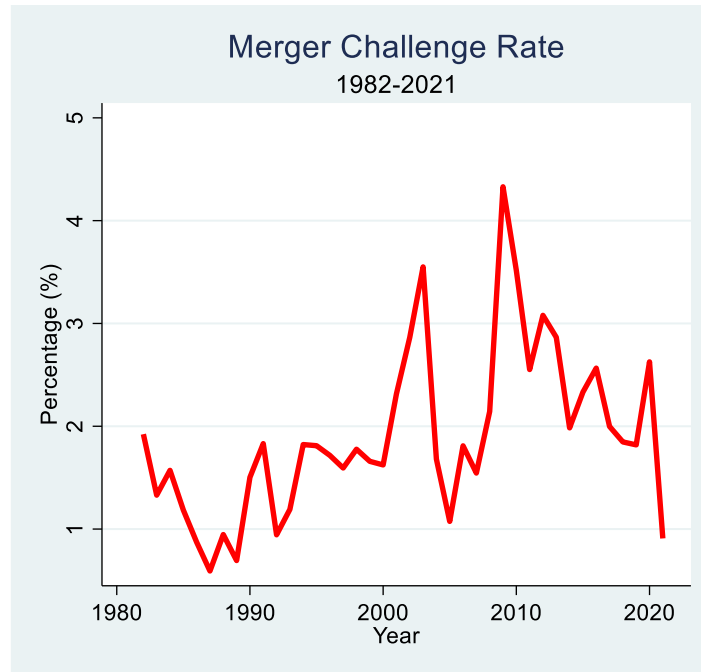
**Figure 3 – Horizontal Merger Percentage**

Notes: This figure shows the percentage of reported HSR mergers that are intra-industry (horizontal). It uses information in the FTC and Department of Justice Annual Competition Reports. The HSR merger data used are over 1982-2021. The fiscal year is reported on the horizontal axis.



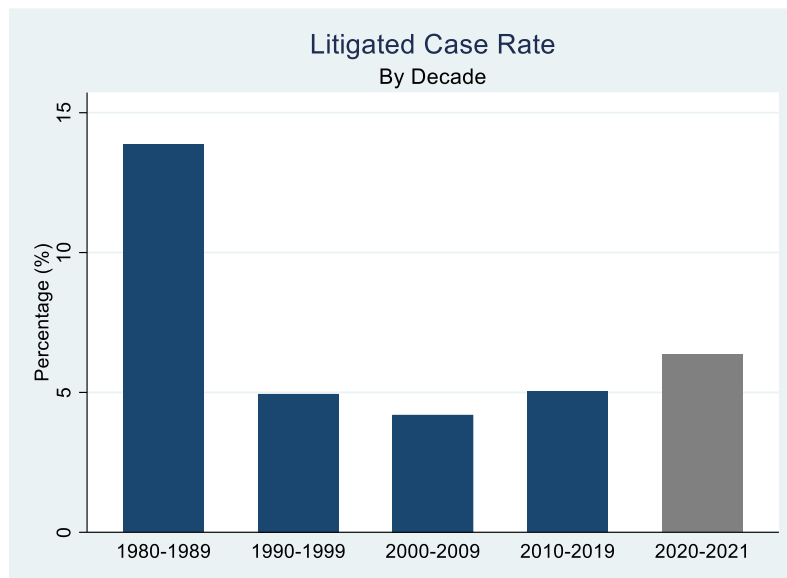
**Figure 4 – Large Merger Percentage**

Notes: This figure shows the percentage of reported HSR mergers that exceed \$1 billion (not inflation-adjusted). It uses information in the FTC and Department of Justice Annual Competition Reports. The HSR merger data used are over 1982-2021. The fiscal year is reported on the horizontal axis.



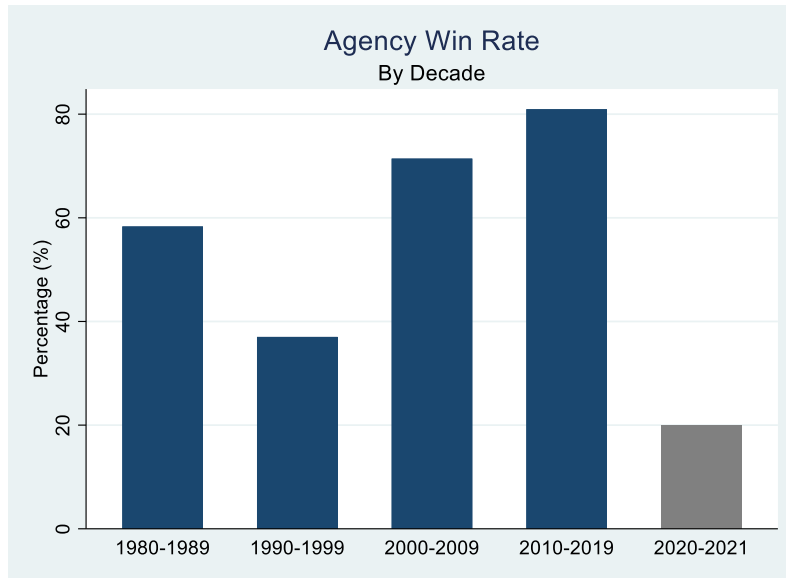
**Figure 5 – Agency Merger Challenge Rate**

Notes: This figure presents the annual merger challenge rate (MC Rate) stated as a percentage, reflecting the ratio of Agency challenges to reported HSR-eligible mergers. It uses information in the FTC and Department of Justice Annual Competition Reports (ACRs). HSR merger and challenge data are available over 1979-2021. The fiscal year is reported on the horizontal axis.



**Figure 6 – Litigated Case Rate**

Notes: This figure shows the percentage of reported HSR mergers that are challenged by the Agencies and proceed to trial by decade. It uses information in the FTC and Department of Justice Annual Competition Reports. The fiscal year decade is shown on the horizontal axis. There are several fiscal years where challenges did not result in a fully-litigated trial (viz., 1983, 1987, 1999, 2001, 2006, and 2010). The current decade (viz., 2020-2021) reflects only two years of information (75 challenges and five trials) and is color-coded to denote its small sample size.



**Figure 7 – Agency Win Rate**

Notes: This figure shows the percentage of fully-litigated merger cases won by the Agencies (*TRIAL WON*) in litigated mergers by decade. It uses information in the FTC and Department of Justice Hart-Scott-Rodino (HSR) Annual Reports and the WestLaw database. The decision year is shown on the horizontal axis. The current decade (*viz.*, 2020-2021) reflects only two years of information and is color-coded to denote its small sample size.

**Table 1 – Summary Statistics (Fiscal Year-Level)**

VARIABLE	OBS	MEAN	STD DEV	MIN	MAX
<i>FISC YEAR</i>	40	2001.50	11.69	1982.00	2021.00
<i>HSR MERGERS</i>	40	2124.63	1009.78	716.00	4926.00
<i>HM PCT</i>	40	0.41	0.16	0.04	0.72
<i>LM PCT</i>	39	0.08	0.05	0.01	0.17
<i>CHALLENGES</i>	40	36.93	16.94	15.00	84.00
<i>MC RATE [CHAL/HSR]</i>	40	0.02	0.01	0.01	0.04
<i>LIT CASES</i>	40	2.15	1.64	0.00	6.00
<i>LC RATE [LIT CASES/CHAL]</i>	40	0.07	0.07	0.00	0.29
<i>BUDGET</i>	40	386.24	107.39	231.54	540.22

**Table 2 – Correlation Statistics (Fiscal Year-Level)**

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>(1)</b> <i>FISC YEAR</i>	1.00								
<b>(2)</b> <i>HSR MERGERS</i>	-0.08	1.00							
<b>(3)</b> <i>HM PCT</i>	-0.25	0.45	1.00						
<b>(4)</b> <i>LM PCT</i>	0.96	-0.13	-0.35	1.00					
<b>(5)</b> <i>CHALLENGES</i>	0.30	0.71	0.54	0.17	1.00				
<b>(6)</b> <i>MC RATE [CHAL/HSR]</i>	0.50	-0.43	0.01	0.40	0.27	1.00			
<b>(7)</b> <i>LIT CASES</i>	-0.21	0.06	-0.13	-0.17	-0.05	-0.15	1.00		
<b>(8)</b> <i>LC RATE [LIT CASES/CHAL]</i>	-0.41	-0.13	-0.23	-0.32	-0.39	-0.31	0.86	1.00	
<b>(9)</b> <i>BUDGET</i>	0.93	-0.29	-0.29	0.92	0.19	0.64	-0.27	-0.42	1.00

**Table 3 – Summary Statistics (Fully Litigated Trial-Level)**

VARIABLE	OBS	MEAN	STD DEV	MIN	MAX
<i>FISC YEAR</i>	86	1999.71	12.14	1982.00	2021.00
<i>DEC YEAR</i>	86	2000.49	12.09	1982.00	2021.00
<i>FTC</i>	86	0.64	0.48	0.00	1.00
<i>REAGAN ADMIN</i>	86	0.27	0.45	0.00	1.00
<i>BUSH (GHW) ADMIN</i>	86	0.14	0.35	0.00	1.00
<i>CLINTON ADMIN</i>	86	0.16	0.37	0.00	1.00
<i>BUSH (GW) ADMIN</i>	86	0.15	0.36	0.00	1.00
<i>OBAMA ADMIN</i>	86	0.19	0.39	0.00	1.00
<i>TRUMP ADMIN</i>	86	0.09	0.29	0.00	1.00
<i>TRIAL WON</i>	86	0.59	0.49	0.00	1.00
<i>DEM JUDGE</i>	86	0.38	0.49	0.00	1.00

**Table 4 – Correlation Statistics (Fully-Litigated Trial-Level)**

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>(1)</b> <i>FISC YEAR</i>	1.00										
<b>(2)</b> <i>DEC YEAR</i>	0.99	1.00									
<b>(3)</b> <i>FTC</i>	0.14	0.13	1.00								
<b>(4)</b> <i>REAGAN ADMIN</i>	-0.69	-0.66	-0.04	1.00							
<b>(5)</b> <i>BUSH (GHW) ADMIN</i>	-0.29	-0.32	-0.12	-0.24	1.00						
<b>(6)</b> <i>CLINTON ADMIN</i>	-0.10	-0.11	0.00	-0.27	-0.18	1.00					
<b>(7)</b> <i>BUSH (GW) ADMIN</i>	0.20	0.21	0.05	-0.26	-0.17	-0.19	1.00				
<b>(8)</b> <i>OBAMA ADMIN</i>	0.57	0.57	0.05	-0.29	-0.19	-0.21	-0.20	1.00			
<b>(9)</b> <i>TRUMP ADMIN</i>	0.52	0.51	0.07	-0.19	-0.13	-0.14	-0.14	-0.15	1.00		
<b>(10)</b> <i>TRIAL WON</i>	0.14	0.11	0.27	-0.03	-0.08	-0.08	0.02	0.27	-0.14	1.00	
<b>(11)</b> <i>DEM JUDGE</i>	-0.01	-0.02	-0.06	0.17	-0.11	-0.15	-0.07	0.11	-0.01	0.07	1.00

**Table 5 – Empirical Results**

FIRST STAGE (DV = CH_DV)			SECOND STAGE (DV = TR_DV)			THIRD STAGE (DV = DEC_DV)		
VARIABLE	MOD 1	MOD 2	VARIABLE	MOD 1	MOD 2	VARIABLE	MOD 1	MOD 2
<i>LN(BUDGET)</i>	0.542*** (0.132)	0.543*** (0.132)	<i>FISCAL YEAR</i>	-0.019*** (0.005)		<i>DEC YEAR</i>	0.018* (0.009)	0.019* (0.008)
<i>LN(HSR)</i>	-0.210*** (0.036)	-0.210*** (0.036)	<i>BUSH (GHW) ADMIN</i>		-0.156 (0.137)	<i>HM PCT</i>	0.448 (0.635)	0.673 (0.559)
<i>HM PCT</i>	0.508*** (0.112)	0.508*** (0.112)	<i>CLINTON ADMIN</i>		-0.963** (0.300)	<i>COURT DEM</i>	0.079 (0.178)	0.066 (0.152)
<i>LM PCT</i>	-1.193 (0.768)	-1.198 (0.767)	<i>BUSH (GW) ADMIN</i>		-0.594*** (0.168)	<i>DC CIRCUIT</i>	0.335 (0.209)	0.249 (0.187)
<i>HSR AMENDMENT</i>	-0.136** (0.051)	-0.136** (0.051)	<i>OBAMA ADMIN</i>		-0.625** (0.200)	<i>CONSTANT</i>	-34.883* (17.018)	-37.570* (15.445)
<i>CONSTANT</i>	-3.778*** (0.916)	-3.783*** (0.916)	<i>TRUMP ADMIN</i>		-0.846*** (0.204)			
			<i>HM PCT</i>	-1.187** (0.437)	-0.281 (0.457)			
			<i>CHALLENGES</i>	-0.002 (0.004)	0.006 (0.005)			
			<i>FTC</i>	0.284*** (0.086)	0.268** (0.085)			
			<i>CONSTANT</i>	37.471*** (10.127)	-0.748** (0.239)			
<i>atanhrho_12</i>	-1.122* (0.465)	-1.446* (0.590)						
<i>atanhrho_13</i>	0.271** (0.086)	0.262*** (0.072)						
<i>atanhrho_23</i>	-0.186* (0.073)	-0.209** (0.070)						
Observations	77325	77325						
LR [ $\chi^2(12)$ ]	280.78***	313.54***						

Notes: (1) \*  $p < .10$ ; \*\*  $p < .05$ ; \*\*\*  $p < .01$ . (2) Likelihood Ratio (LR) tests reported for each estimation. (3) The first-stage estimation uses the merger sample. The dependent variable equals one for all HSR reported mergers that are challenged, and zero otherwise. (4) The second-stage estimation uses the challenge sample. The dependent variable equals one for all challenged mergers that are fully-litigated, and zero otherwise. (5) The third-stage estimation uses the trial sample. The dependent variable equals one for those fully-litigated trials where the Agency wins, and zero otherwise. (6) Standard errors are reported below the coefficients, and are robust and clustered (by fiscal year).

## APPENDIX

### Proof of Proposition 1

$A$  identifies a remedy for all  $h \in (h_r, \bar{h}]$  and  $M$  accepts the identified remedy if  $h \in (h_r, \tilde{h}]$ . (Recall Finding 1.) Therefore, the probability that  $M$  accepts an identified remedy, given  $\hat{s}$ , is  $\frac{G(\tilde{h}|\hat{s}) - G(h_r|\hat{s})}{1 - G(h_r|\hat{s})}$ . The rate at which this probability varies with  $\hat{s}$  is:

$$\frac{d}{d\hat{s}} \left( \frac{G(\tilde{h}|\hat{s}) - G(h_r|\hat{s})}{1 - G(h_r|\hat{s})} \right) = \frac{A_1}{[1 - G(h_r|\hat{s})]^2}, \text{ where} \quad (\text{A1})$$

$$\begin{aligned} A_1 \equiv & [1 - G(h_r|\hat{s})] \left[ g(\tilde{h}|\hat{s}) \frac{d\tilde{h}}{d\hat{s}} - g(h_r|\hat{s}) \frac{dh_r}{d\hat{s}} + G_{\hat{s}}(\tilde{h}|\hat{s}) - G_{\hat{s}}(h_r|\hat{s}) \right] \\ & + [G(\tilde{h}|\hat{s}) - G(h_r|\hat{s})] \left[ g(h_r|\hat{s}) \frac{dh_r}{d\hat{s}} + G_{\hat{s}}(h_r|\hat{s}) \right]. \end{aligned} \quad (\text{A2})$$

Expressions (A1) and (A2) imply:

$$\frac{d}{d\hat{s}} \left( \frac{G(\tilde{h}|\hat{s}) - G(h_r|\hat{s})}{1 - G(h_r|\hat{s})} \right) = \left[ \frac{g(\tilde{h}|\hat{s})}{1 - G(h_r|\hat{s})} \right] \frac{d\tilde{h}}{d\hat{s}} + \frac{A_2}{[1 - G(h_r|\hat{s})]^2}, \text{ where} \quad (\text{A3})$$

$$\begin{aligned} A_2 \equiv & [1 - G(h_r|\hat{s})] [G_{\hat{s}}(\tilde{h}|\hat{s}) - G_{\hat{s}}(h_r|\hat{s})] + [G(\tilde{h}|\hat{s}) - G(h_r|\hat{s})] G_{\hat{s}}(h_r|\hat{s}) \\ & + [G(\tilde{h}|\hat{s}) - G(h_r|\hat{s}) - 1 + G(h_r|\hat{s})] g(h_r|\hat{s}) \frac{dh_r}{d\hat{s}} \\ = & G_{\hat{s}}(\tilde{h}|\hat{s}) - G_{\hat{s}}(h_r|\hat{s}) - G(h_r|\hat{s}) G_{\hat{s}}(\tilde{h}|\hat{s}) + G(h_r|\hat{s}) G_{\hat{s}}(h_r|\hat{s}) \\ & + G(\tilde{h}|\hat{s}) G_{\hat{s}}(h_r|\hat{s}) - G(h_r|\hat{s}) G_{\hat{s}}(h_r|\hat{s}) - [1 - G(\tilde{h}|\hat{s})] g(h_r|\hat{s}) \frac{dh_r}{d\hat{s}} \\ = & G_{\hat{s}}(\tilde{h}|\hat{s}) - G_{\hat{s}}(h_r|\hat{s}) - G(h_r|\hat{s}) G_{\hat{s}}(\tilde{h}|\hat{s}) + G(\tilde{h}|\hat{s}) G_{\hat{s}}(h_r|\hat{s}) \\ & - [1 - G(\tilde{h}|\hat{s})] g(h_r|\hat{s}) \frac{dh_r}{d\hat{s}} \\ = & [1 - G(h_r|\hat{s})] G_{\hat{s}}(\tilde{h}|\hat{s}) - [1 - G(\tilde{h}|\hat{s})] G_{\hat{s}}(h_r|\hat{s}) - [1 - G(\tilde{h}|\hat{s})] g(h_r|\hat{s}) \frac{dh_r}{d\hat{s}}. \end{aligned}$$

When the impact of  $\hat{s}$  on  $g(\cdot)$  is sufficiently limited,  $G_{\hat{s}}(\tilde{h}|\hat{s})$ ,  $G_{\hat{s}}(h_r|\hat{s})$ , and  $\frac{dh_r}{d\hat{s}}$  all approach 0, so  $A_2$  approaches 0. Therefore, expression (A3) implies that is this case:

$$\frac{d}{d\hat{s}} \left( \frac{G(\tilde{h}|\hat{s}) - G(h_r|\hat{s})}{1 - G(h_r|\hat{s})} \right) \approx \left[ \frac{g(\tilde{h}|\hat{s})}{1 - G(h_r|\hat{s})} \right] \frac{d\tilde{h}}{d\hat{s}} < 0. \quad (\text{A4})$$

The inequality in expression (A4) holds because  $\frac{d\tilde{h}}{d\hat{s}} < 0$ , from Finding 2. Expression (A4) implies that the probability  $M$  accepts an identified remedy increases as  $\hat{s}$  declines when the impact of  $\hat{s}$  on  $g(\cdot)$  is sufficiently limited. ■

### Proof of Proposition 2

The probability that  $M$  prevails in court, given  $h$  and  $\hat{s}$ , is  $F(\hat{s}|h)$ . Therefore, because  $M$  proceeds to court if and only if  $h \in (\tilde{h}, \bar{h}]$  (recall Finding 1), the probability that  $M$  prevails in court, given  $\hat{s}$ , is  $\int_{\tilde{h}}^{\bar{h}} F(\hat{s}|h) g(h|\hat{s}) dh$ . The rate at which this probability varies with  $\hat{s}$  is:

$$\begin{aligned} & \frac{d}{d\hat{s}} \left( \int_{\tilde{h}}^{\bar{h}} F(\hat{s}|h) g(h|\hat{s}) dh \right) \\ &= \int_{\tilde{h}}^{\bar{h}} [f(\hat{s}|h) g(h|\hat{s}) + F(\hat{s}|h) g_s(h|\hat{s})] dh - F(\hat{s}|\tilde{h}) g(\tilde{h}|\hat{s}) \frac{d\tilde{h}}{d\hat{s}} \\ &> 0 \text{ when } g_s(h|\hat{s}) \text{ is sufficiently close to } 0. \end{aligned} \tag{A5}$$

The inequality in expression (A5) holds because  $f(\cdot)$ ,  $g(\cdot)$ , and  $F(\cdot)$  are positive and because  $\frac{d\tilde{h}}{d\hat{s}} < 0$ , from Finding 2. Expression (A5) implies that the probability  $M$  prevails in court declines as  $\hat{s}$  declines when the impact of  $\hat{s}$  on  $g(\cdot)$  is sufficiently limited. ■