To the EALE organizers: This paper was accepted for presentation at the 34th EALE Conference in London but I was not able to present the paper because of the rule that no participant may present two papers at the same conference meeting. I am again submitting two papers for the conference this year. If both are accepted, I will choose to present this paper. Note that the paper has been substantially revised since last year. Thank you.

**PER SE IN ITSELF:**

**HOW BANS REDUCE ERROR IN ANTITRUST**

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**ABSTRACT**

In recent decades, antitrust courts in the United States, concerned with reducing error costs, have replaced many bans with case-by-case review of conduct for consumer harm under the rule of reason. I identify three ways in which bans are sometimes necessary to minimize error costs, even when they condemn good conduct. The first arises when conduct is so uniformly harmful that the minimal error cost associated with a rule of reason is actually greater than the error cost associated with a ban. The second arises when enforcement budgets are too small to cover the cost of exposing conduct to a rule of reason, leading to gaps in enforcement. The third arises when a ban on one type of conduct would free up enforcement resources for investment in more careful rule of reason treatment of another type of conduct. I show that effective antitrust enforcement budgets in the United States peaked in the 1940s, creating a budget constraint, and that several United States Supreme Court cases may have had counterintuitive error cost effects due to this constraint.

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I. INTRODUCTION

Starting in the 1970s, antitrust in the United States came under an assault that nearly killed it. A large part of that assault came in the form of the argument that antitrust was mistakenly condemning too many innocent firms and should therefore replace bans that it had imposed on many putatively anticompetitive practices with case-by-case review for harm to consumers, a standard known to antitrust as a “rule of reason.” In response, courts applying the antitrust laws embraced the notion that it is only ever appropriate to ban conduct if it is known always to be bad, or to exempt it if it is known always to be good. Whenever there is uncertainty, they now impose a rule of reason. Antitrust enforcement has withered under this approach, but antitrust proponents have never been able to mount a defense of the old bans against the charge of error. In this article, I show that bans, which are known

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1 For a discussion of this assault, see infra Part V.C. The notion that antitrust nearly died as a result is the author’s subjective assessment. For the view that the assault merely shifted the terms of a compromise between big business and everyone else, without threatening to scrap it in favor of laissez faire, see Jonathan B. Baker, Economics and Politics: Perspectives on the Goals and Future of Antitrust, 81 Fordham L. Rev. 2175, 2188–89 (2012).


3 See infra Part V.A.

4 Id.

5 The connection between rules of reason and laissez faire has long been a concern of antitrust proponents. See Herbert Hovenkamp, Federal Antitrust Policy: The Law of Competition and Its Practice 66 (4th ed. 2011) (“[M]any Progressive Era liberals believed that the rule of reason would greatly weaken the Sherman Act[,]”). I mean by greater laissez faire in antitrust enforcement an increase in under-enforcement. See Part II.B. For a discussion of the history and meaning of the term, see Barbara Fried, The Progressive Assault on Laissez Faire: Robert Hale and the First Law and Economics Movement 29–32 (1998). For a list of the ways in which antitrust enforcement withered under the new rule of reason regime, see infra notes 20–23 and accompanying text.
to antitrust as per se rules of illegality, can actually result in less error cost than rules of reason even when they are applied to punish some innocent firm. I use this result to evaluate the effects of a number of important antitrust cases decided in recent decades. The analysis here departs from earlier treatments of antitrust error costs in part by considering the role of constrained enforcement budgets in driving up error costs. I show that the effective budgets of the major antitrust enforcers, the U.S. Federal Trade Commission (“FTC”) and the U.S. Department of Justice Antitrust Division (“Antitrust Division”), have fallen in recent decades.

A ban can reduce error costs relative to a rule of reason in three circumstances. The first relies on the observation that although rules of reason can reduce error costs relative to bans, or their opposites, per se rules of legality, they are not infallible and can be expected to result in some under-enforcement, however small. As a result, a ban reduces error costs when so much of the conduct falling within the ambit of the antitrust laws is bad that the value of the good conduct destroyed by the ban is less than the value of the bad conduct allowed under a rule of reason. In this case, a ban is to be preferred to a rule of reason even if enforcement budgets are large and enforcers could afford to subject all conduct to a rule of reason if they

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6 See, e.g., Richard A. Posner, Antitrust Law 39 (2d ed. 2001) (defining a per se rule with respect to a particular practice as one for which “all that has to be proved to fix liability . . . is that the defendant engaged in the practice”).

7 The basic antitrust error cost model upon which I build is contained in Arndt Christiansen & Wolfgang Kerber, Competition Policy with Optimally Differentiated Rules Instead of “Per Se Rules vs Rule of Reason,” 2 J. COMPETITION L. & ECON. 215 (2006) (outlining basic model of antitrust rule choice). This literature is a branch of the law and economics literature on optimal rules. See Juwon Kwak, Optimal Antitrust Enforcement: Information Cost and Deterrent Effect, 41 EUR. J. L. & ECON. 371, 871–72 (2016) (discussing this literature). As applied to antitrust, it starts with Beckner and Salop, who call for the application of decision theory to structure the rule of reason. C. Frederick Beckner III & Steven C. Salop, Decision Theory and Antitrust Rules, 67 ANTITRUST L.J. 41 (1999). Kwak extends the model of Christiansen and Kerber along lines suggested by Beckner and Salop by modeling the error costs of a rule of reason as a function of the information of enforcers regarding firm behavior and modelling the deterrence effects of rules. See Kwak, supra, at 872 (noting that Christiansen and Kerber treat the effect of rules as exogenous). Katsoulacos and Ulph also model deterrence. See Yannis Katsoulacos & David Ulph, On Optimal Legal Standards for Competition Policy: A General Welfare-Based Analysis, 57 J. INDUS. ECON. 410 (2009). Kwak’s model may be understood as a special case of my own in which the magnitudes of over- and under-enforcement harm caused by the rule of reason are determined by a deterrence model and in which only one antitrust rule may be applied to all conduct at any given time. In the appendix, I show how Kwak’s model may be adapted to incorporate a mix of rules and show that my basic result that bans are sometimes optimal also applies in Kwak’s model.

8 For a discussion of limits on enforcement budgets, see infra Part III. For a discussion of the relative cost of per se rules and rules of reason, see infra note 48 and accompanying text.
wished. This circumstance has already been recognized by commentators.

The second circumstance, which has not heretofore been recognized, is when enforcers cannot afford to impose a blanket rule of reason on all conduct, even though doing so would minimize error cost. In this case, resort to a cheaper rule, such as a ban, or its counterpart, a per se rule of legality, at least for some subset of conduct, is unavoidable. The only question is whether it is better to err on the side of over-enforcement, by embracing a ban, or under-enforcement, by embracing a rule of per se legality. If the share of conduct that is bad is thought to be large relative to the share that is good, then it is optimal to impose bans on all conduct that enforcers cannot afford to subject to a rule of reason.

I note that the courts cannot leave it to enforcers, by which I mean the FTC, Antitrust Division, and plaintiff’s attorneys, to convert rules of reason to bans when it is optimal to do so. When asked to enforce rules of reason that they cannot afford, enforcers can respond only by reducing the amount of conduct that they regulate, in effect imposing rules of per se legality at the enforcement level over conduct that they can no longer afford to monitor. This is the power of non-enforcement afforded enforcers by the doctrine of prosecutorial discretion and the right of any plaintiff not to bring a civil case. Unless courts embrace bans when it is optimal to do so, enforcers will respond to unaffordable expansions in the use of rules of reason with under-enforcement.

The third circumstance, which also has not heretofore been recognized, is when the budget is sufficient to pay for full rule of reason coverage, but cost savings from shifting some of the rule of reason to a lower cost ban are large enough to buy an increase in rule of reason intensity within its remaining ambit sufficient to reduce error costs. This last circumstance is important because it establishes that even when enforcers can afford to convert all rules to rules of reason, leaving some bans in place can result in lower error costs. It is possible because reducing the coverage area of a rule of reason in favor of bans saves enforcers money. If this money is plowed back into the rules of reason that remain, it may buy enough of an increase in rule of reason intensity, and thereby enough of a reduction in error cost over this remaining rule of reason coverage area, to offset the increase in error costs.

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9 See infra Part II.D.1.
10 See Katsoulacos & Ulph, supra note 7, at 424–45; Kwak, supra note 7, at 383–84.
11 See infra Part II.D.2.
13 Part II.C.
14 See infra Part II.D.3.
costs associated with preserving the bans.

To reach these results, I observe that when a judge applies a rule of reason to an area of conduct, it is because the judge knows no more about the character of the conduct than the relative amounts of good and bad contained within it. For example, a judge who applies a rule of reason to evaluate a merger that reduces the number of competitors in a market to three might think that such mergers are mostly good for consumers, or mostly bad, but is unlikely to be able to distinguish good mergers of this kind from bad ex ante. That is why the judge chooses to engage in case-specific review of the conduct for consumer harm. I therefore evaluate the effects of various antitrust rules assuming only that there is information regarding the overall distribution of good and bad within the category of conduct under consideration. This allows me to depart from the literature by considering whether conduct about which little is known should be divided between more than one rule, rather than just fully given over to one rule or another.\textsuperscript{15} I am able to do that because I can suppose, given lack of better information about the distribution of good and bad within any subset of the conduct at issue, that the distribution of good and bad within the subset mirrors the distribution of good and bad within the entire category as a whole.

Error costs are of two kinds, those associated with the mistaken condemnation of good conduct, which are known as over-enforcement, false positive, or Type I error costs, and those associated with the mistaken failure to condemn bad conduct, which are known as under-enforcement, false negative, or Type II error costs.\textsuperscript{16} An important consequence of the model of error costs that I construct is that there is a tradeoff between error types in switches between per se rules of legality and illegality, as well as rules of reason. While conversion of a ban to a rule of reason may greatly reduce over-enforcement harm, for example, it also must increase under-
enforcement harm by some small amount, because a rule of reason is imperfect, and fails to identify all bad conduct. This guarantees the existence of a tradeoff between the two types of harm.\footnote{Part II.B.}

It follows that, as a general rule, an increase in enforcement accuracy, in the sense of a reduction in both types of error at the same time, can be achieved only by spending more on enforcement and never by a mere change from one rule to another.\footnote{Part II.C.} The only way to increase accuracy is by increasing the care with which conduct is evaluated under a rule of reason; but a more thorough rule of reason is costlier to implement.

Antitrust regulates three broad categories of conduct, collusion with other firms, exclusion of other firms, and mergers between firms, applying to acts falling within them bans, allowances, or rules of reason depending on the extent to which it believes the acts to harm consumers.\footnote{To violate antitrust law it is necessary, though not sufficient, to have agreement, in which case there is a potential claim under Section 1 of the Sherman Act, exclusionary conduct, in which case there is a potential claim under Section 2 of that act, or a merger, in which case there is a potential violation of Section 7 of the Clayton Act. See 15 U.S.C. §§ 1, 2, 15 (2013); POSNER, supra note 6, at 101, 193 (associating Section 1 with collusion and Section 2 with exclusion); Louis Kaplow, The Meaning of Vertical Agreement and the Structure of Competition Law, 80 ANTITRUST L.J. 563, 563 (2016) (“Competition law is aimed primarily at agreements, mergers, and the actions of dominant firms”). There is no roving antitrust cause of action that may be called upon whenever there is anticompetitive harm. Section 5 of the FTC Act is perhaps a counterexample, but it is rarely used in this way. 15 U.S.C. § 45; see William E. Kovacic & Marc Winerman, Competition Policy and the Application of Section 5 of the Federal Trade Commission Act, 76 ANTITRUST L.J. 929, 931, 933–34 (2010) (observing that Section 5 was meant to serve at the “expansion joint in the U.S. competition policy system” but “one would be hard-pressed” to find ten Section 5 cases that “have had a notable impact, either in terms of doctrine or economic effects”). For antitrust’s consumer welfare standard, see supra note 2.}

\footnote{Leegin Creative Leather Products v. PSKS, Inc., 551 U.S. 877, 907 (2007).}

\footnote{Andrew I. Gavil et al., Antitrust Law in Perspective: Cases, Concepts, and Problems in Competition Policy 845, 849 (2d ed. 2008) (observing that courts “progressively have imposed greater burdens of proof on plaintiffs challenging exclusive dealing” and the share of the market that must have been foreclosed by exclusive dealing contracts before liability will attach has “grown significantly from . . . single digits . . . to . . . more than 30%”) (internal quotation marks omitted).}

\footnote{Fortner Enterprises, Inc. v. United States Steel Corp., 394 U.S. 495, 503 (1969) (requiring .}
and exclusionary, and competitors to merge and raise prices. In making these changes, the courts have seemed unaware of the tradeoff between over-enforcement harm and under-enforcement harm. Instead, they seem to think, mistakenly, that these rule changes increase accuracy. Without an increase in enforcement budgets, however, such individual rule changes cannot achieve that goal.

I show that the budgets of the Antitrust Division, FTC, and private enforcers have not expanded to accommodate the move toward rules of reason. Although the budgets of federal enforcers have increased in real terms since the 1970s; the volume of conduct that enforcers must regulate, as measured by the size of economy, has increased more. Although federal administrative productivity has grown over this period, perhaps as a result of advances in information technology, it has not done so enough to compensate for the economy’s growth. I show that after adjusting for economic and productivity growth, enforcement budgets peaked in the 1940s and have fallen steadily since the 1970s. I argue that private enforcement budgets have fallen as well.

My framework suggests that recent antitrust rule changes could have had quite counterintuitive effects. For example, when a court extends antitrust regulation to a new practice under a rule of reason standard, it might appear that it is strengthening enforcement. But without a budget increase enforcers may reduce enforcement of bans in other areas in response. Because bans are more effective at catching anticompetitive conduct than rules of reason,

that defendant have “appreciable economic power” before the traditional per se rule against tying may be applied).

23 For evidence that merger enforcers in recent years have tended to approve deals that result in higher prices, see John E. Kwoka, Jr., Does Merger Control Work? A Retrospective on US Enforcement Actions and Merger Outcomes, 78 ANTITRUST L.J. 621 (2013) (observing that “a very large fraction of carefully studied mergers shows that those mergers resulted in higher prices, even when a remedy was imposed”).

24 By contrast, some commentators have suggested that there is a tradeoff. See Jonathan B. Baker & Steven C. Salop, Antitrust, Competition Policy, and Inequality, 104 Geo. L.J. ONLINE 1, 21 (2015) (“While raising concerns about false positives, the Court has not analyzed the incidence and consequences of false positives, nor compared the resulting costs with the social benefits of antitrust enforcement or the incidence and consequences of false negatives and under-deterrence.”); Maurice E. Stucke, Does the Rule of Reason Violate the Rule of Law?, 42 U.S. DAVIS L. REV. 1386 (2009) (“Because a rule-of-reason case is so costly to try, it is likely that fewer antitrust violations will be challenged.”). Others seem unaware of one. See Frank H. Easterbrook, Limits of Antitrust, 63 Tex. L. REV. 1, 10, 15–16 (1984) (“We cannot condemn so quickly anymore. What we do not condemn, we must study. The approved method of study is the Rule of Reason.”); Geoffrey A. Manne & Joshua D. Wright, Innovation and the Limits of Antitrust, 6 J. COMPETITION L. & ECON. 153, 195 (2010) (describing replacement of per se rules with rules of reason as “all to the good”).

25 Part III.
this allows more anticompetitive conduct to escape enforcement and increases laissez faire. This is the likely result of the Supreme Court’s recent decision in *FTC v. Actavis* to impose a rule of reason on reverse payment settlements.  

When a court narrows the categories of conduct to which a rule of reason applies, it might think that it is weakening antitrust by conferring immunity on those practices left out of the narrowed rule. When this move is not accompanied by a reduction in enforcement budgets, however, enforcers respond by using savings from the narrowing of the rule to ramp up enforcement in other areas. The net effect can be to increase enforcement in the sense of reducing the rate at which harmful practices escape condemnation under the antitrust laws. This appears to be the consequence of several decades of narrowing of liability for exclusive dealing, predatory pricing, and refusals to deal wrought by courts that have sometimes expressed a desire to increase laissez faire thereby.  

I proceed as follows. I give an outline of the structure and assumptions of the model, show how error costs change for each possible change in the law, with and without a budget constraint, and then identify the optimal mix of rules. I next use federal antitrust enforcement budget time series to make the case for the existence of a budget constraint, pausing to consider how budget changes revealed by the data compare with stylized facts about the ebb and flow of antitrust enforcement. I then draw a distinction between the zero-error-cost per se rules pursued by the courts in recent years and the high-error-cost per se rules that are required for optimality in my model. I then consider each of several rule changes made by the courts in recent years in applying the presumption in favor of a rule of reason and discuss their effects. Finally, I consider the optimal level of bias in the amounts of over- and under-enforcement harm allowed by a rule of reason.

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27 See, e.g., Novell, Inc. v. Microsoft Corp., 731 F.3d 1064, 1076 (10th Cir. 2013) (“If the [monopolization] doctrine [of no duty to deal] fails to capture every nuance, if it must err still to some slight degree, perhaps it is better that it should err on the side of firm independence—given its demonstrated value to the competitive process and consumer welfare—than on the other side where we face the risk of inducing collusion and inviting judicial central planning.”); see Part V.C.4.  
28 Part II.A.  
29 Parts II.B & II.C.  
30 Part II.D.  
31 Part III.  
32 Part V.A.  
33 Part V.  
34 Part VI.
II. A MODEL OF ANTITRUST ERROR COSTS

In this Part, I first outline the building blocks of my approach to error costs, then show how they predict the error cost consequences of various rule changes, and, finally, show how they suggest three circumstances in which bans reduce error costs relative to rules of reason. The results identified here provide the foundation for my evaluation of U.S. Supreme Court antitrust practice in subsequent Parts.

A. Foundation

Suppose that a court must decide how to regulate a particular category of conduct. It might know some of it to be good for consumers and some to be bad. The good it must of course allow, and the bad ban. But once it is through disposing of all the conduct it can evaluate with certainty, there must remain some within it about which it is unsure. The court might think this residual conduct mostly good or mostly bad, but it must be unable to distinguish the value of any particular act that belongs to it. The U.S. Supreme Court today would subject all of that conduct residual conduct to a rule of reason, on the theory that it ought to get to know it better, through case-by-case review for harm to consumers, before it can decide whether to ban it or allow it. But that is a mistake. Sometimes it should ban it, and sometimes it should divide it between a ban and a rule of reason, quite arbitrarily, and even though it will surely end up condemning some good conduct as a result. Whether a ban is appropriate depends on how much good the court thinks is in the conduct, relative to the bad, and on how expensive the court thinks it will be for enforcers to apply a rule of reason

35 The goal of antitrust is to protect consumers from harm in the economic sense, so a court’s goal in applying the antitrust laws is to condemn all conduct within antitrust’s ambit that is bad for consumers and to preserve all conduct within it that is good for them. See supra note 2.
36 See California Dental Assn. v. FTC, 526 U.S. 756, 780–81 (1999) (“[T]here is generally no categorical line to be drawn between restraints that give rise to an intuitively obvious inference of anticompetitive effect and those that call for more detailed treatment. What is required, rather, is an enquiry meet for the case, looking to the circumstances, details, and logic of a restraint. The object is to see whether the experience of the market has been so clear, or necessarily will be, that a confident conclusion about the principal tendency of a restriction will follow from a quick [or at least quicker] look, in place of a more sedulous one. And of course what we see may vary over time, if rule-of-reason analyses in case after case reach identical conclusions.”)(internal quotation marks omitted). This point is made in greater detail in Part V.
37 See infra Part II.D.
relative to a ban. When a court knows only the relative proportion of good and bad conduct within some area of business practice, the court must assume that no matter how it slices up the conduct, the proportion of good and bad conduct within the slices will be the same as the assumed proportion in the whole. That is known as the principle of insufficient reason: that the characteristics of the whole are spread uniformly throughout its parts. It represents the principal way, along with attention to enforcement costs, in which my approach differs from other work on antitrust enforcement costs. The assumption makes it possible to suggest the imposition of multiple rules to regulate a particular area of conduct about which antitrust is uncertain by dividing the conduct arbitrarily into parts of optimal sizes. Other works allow only a single rule to be chosen for any given area of conduct about which only overall levels of good or bad conduct are known. By opening up the possibility of partial coverage, it becomes clear that it is often optimal to have bans alongside rules of reason.

Within this framework, two things are required to compare the error costs of two rules: (1) the relative sizes of the areas of conduct that they cover and (2) the effects of the rules on conduct. For example, suppose that conduct is divided into two parts, one accounting for 40% of total possible error costs and the other for the remaining 60%. The first is banned, meaning that both the good and bad conduct are destroyed. The error cost will lie entirely in the over-enforcement wrought by the destruction of the good conduct; destroying the bad conduct is not error. The magnitude of the over-enforcement error will be 100% of 40% of the court’s guess concerning the value of all the good within the conduct under consideration, or 40% of it. Suppose that the second, 60%, region, is allowed. The error cost will lie entirely in the bad conduct that will go without condemnation. Its magnitude will be 100% of the 60% of the court’s guess concerning the value of all the bad within the conduct under consideration as a whole, or 60% of the bad. Total error cost for this policy of banning 40% and allowing 60% will be 40% of the good conduct destroyed, plus 60% of the bad conduct allowed.

The actual value will depend on the court’s guesses for these numbers. If

38 See id.
39 Good and bad conduct here may be understood to be so net of compensating behavior. Thus if two firms prevented from entering into a beneficial R&D joint venture are able to innovate individually anyway at the same cost, resulting in no reduction in consumer welfare, then banning the joint venture would result in no over-enforcement harm. See Devlin & Jacobs, supra note 16 (stating that some of “the second-best solutions that markets will devise in response to Type I errors . . . will be almost as desirable as the impugned behavior”).
40 See, e.g., Kwak, supra note 7 (assuming implicitly that any rule must be applied with full coverage).
it is $10 billion for the good and $20 billion for the bad, then it will be $18 billion in error costs total. But what really matters is not dollar amounts but relative sizes. If the judge thinks that there is more bad than good in this conduct then the effect of the allowance on error will be relatively large, as it is here, and that might be enough to suggest to the court that it is better to choose a ban, as will become clear in the following sections.

In order to fully apply the framework, it is necessary to identify the effects of all three types of rules. I have already touched on two: the ban and the allowance. Antitrust’s per se rule of illegality, which I call a ban, precludes all conduct within its ambit and therefore inflicts 100% of the possible over-enforcement cost associated with the area of application of the rule. Because, in precluding all conduct, it must preclude all bad conduct, it also realizes 0% of the possible under-enforcement cost associated with that area. A per se rule of legality, which I call an allowance, allows all conduct within its ambit and therefore inflicts 100% of under-enforcement cost possible within its ambit. It also inflicts 0% of the possible over-enforcement cost, because it is not associated with any enforcement at all.

The error costs associated with a rule of reason are less straightforward. A rule of reason requires antitrust to scrutinize the area of its application, and, hopefully, do a better job than bans or allowances, which operate indiscriminately, in distinguishing good from bad conduct within that area. Case-by-case review of conduct for efficiency should allow a rule of reason to identify some good conduct and save it from condemnation and to identify some bad conduct and condemn it. It should therefore lead to over-enforcement costs that are a smaller fraction of the total possible within the ambit of its application, which is to say, less than the 100% inflicted by a ban. And it should lead to under-enforcement costs that are a smaller fraction of the total possible than the 100% inflicted by an allowance. Though these shares are below 100%, however, they cannot be 0%. A rule of reason cannot be perfect: I cannot expect it always accurately to distinguish good

41 The $20 billion value for bad conduct gives great weight to the 60% share of under-enforcement error cost created by the allowance, causing under-enforcement error to account for more than 60% of total error costs ($12 billion in a total of $18 billion, or 67%).
42 Christiansen and Kerber define a ban and a rule of reason in ways similar or identical to the ways in which I define them in this article. See Christiansen & Kerber, supra note 7, at 227.
43 The evidence is that the plaintiff almost always loses in rule of reason cases. This suggests that a rule of reason offers no advantage in accuracy relative to an allowance. See Michael A. Carrier, Rule of Reason: An Empirical Update for the 21st Century, 16 GEO. MASON L. REV. 827, 830 (2009) (defendant won in 221 of 222 rule of reason cases surveyed from 1999 to 2009). Needless to say, if it is just an expensive allowance, a rule of reason offers no advantage over an allowance and should never be used.
from bad conduct.\footnote{I mean here a claim no stronger than that economics is never exactly right about anything, including whether a practice is good or bad for consumers. It must be stated immediately that one would not expect to find an exact relationship between any two economic variables, unless it is true as a matter of definition. In textbook expositions of economic theory, the usual way of dealing with this awkward fact is to write down the relationship as if it were exact and to warn the reader that it is really only an approximation. In statistical analysis, however, one generally acknowledges the fact that the relationship is not exact by explicitly including in it a random factor known as the disturbance term. \textsc{Christopher Dougherty}, \textit{Introduction to Econometrics} 44 (3d ed. 2007).} So the share of possible over-enforcement harm created by a rule of reason might be, say, 50%, and the share of under-enforcement harm 50% as well.

I add a final assumption that is also, I think, reasonable, but which I briefly relax later on.\footnote{See infra Part VI.} I assume that a rule of reason inflicts both types of error costs at the same time. That is, it condemns some good conduct, even as it does a better job of preserving good conduct than a ban, and it fails to condemn some bad conduct, despite doing a better job of identifying bad conduct than would an allowance. In particular, I assume for simplicity that a rule of reason inflicts the same percentage of the two types of harm. I did so just now in my example in choosing 50% as the share of both types of harm inflicted by the rule.

The actual percentage of possible harm inflicted by a rule of reason depends on the amount of intensity with which courts require that enforcers embrace the task of distinguishing good from bad conduct. If the intensity is high, which corresponds to large expenditure on enforcement, then the rule will distinguish good from bad with great accuracy and the percent of possible harm inflicted by the rule will be low. If intensity is low, then enforcement cost will be low, but error high. I assume that intensity does not vary across areas to which a rule of reason is applied, but, as I discuss in Part II.D.3, its level across all areas may change.\footnote{I assume this to keep my framework simple. Many of my conclusions would change if I were to abandon this assumption. In particular, my conclusion that it is either optimal to impose as many per se rules as possible or none at all, would no longer be true as a rule. There is some reason to think that the assumption captures reality. \textit{See, e.g.,} Carrier, \textit{supra} note 42, at 827 ("[T]he rule of reason is far less amorphous than commonly believed."). But at least as a doctrinal matter there is variation in the standards applied. For example, efficiencies play a limited role in the rule of reason as applied in merger cases. \textit{See} \textsc{Hovenkamp}, \textit{supra} note 5, at 555 & n.31 ("Most courts that have considered the efficiency defense have been skeptical."). But they are recognized in monopolization cases. \textit{See} \textsc{United States v. Microsoft Corp.}, 253 F.3d 34, 59 (D.C. Cir. 2001) (defendant may rebut plaintiff’s prima facie case by providing a “procompetitive justification,” such as that its conduct}
To have effect, the antitrust laws must be enforced. The choice of which rules to apply must be undertaken with attention to the administrative cost of enforcement, and not just the cost of error, because enforcers that are asked to implement rules that their budgets cannot afford respond by reducing the amount of conduct that they scrutinize, which is equivalent to the imposition of allowances.\footnote{This is discussed in detail in Part II.C.} It follows that imposition of a rule that enforcers cannot afford to enforce amounts to conferring on them the discretion to implement allowances on an ad hoc basis. A choice of rules without attention to budget is therefore just a blind choice of a different set of rules. To make deliberate choices, enforcement budgets must be taken into account.

I mean by enforcement cost the cost to federal enforcers and private plaintiffs of monitoring business conduct and bringing actions for violations of the federal antitrust laws.\footnote{I ignore state competition law and state enforcers in this article, but doing so should not change my results.} These costs have the following basic structure. An allowance must have zero cost, because it involves doing nothing at all about the conduct within its area. By contrast, a ban must involve a cost of enforcement, because monitoring must be put into place to ensure that no conduct falling within its ambit takes place. Finally, the cost of a rule of reason must be greater than the cost of a ban, because it involves not just monitoring to identify conduct falling within its ambit, but also examination of that conduct to determine whether it is good or bad.\footnote{The high relative costs of a rule of reason are well-known. See, e.g., Northern Pacific R.R. Co. v. United States, 356 U.S. 1, 5 (1958) (describing application of a rule of reason as “incredibly complicated and prolonged” relative to application of a per se rule).} As I mentioned above, the cost of that examination may be greater or lesser, depending on the intensity with which it is undertaken. Courts that engage in full-blown rule of reason analysis, including consideration of efficiencies associated with a challenged action, apply the rule with greater intensity.\footnote{For a statement of this full-blown standard, see United States v. Microsoft Corp., 253 F.3d at 58–59.} Those that rely on burden shifting to screen out cases apply the rule with less intensity.\footnote{Hemphill argues that to avoid the cost of balancing under a full-blown rule of reason standard, lower courts have placed a burden on plaintiffs to prove a less restrictive alternative to challenged conduct. See C. Scott Hemphill, Less Restrictive Alternatives in Antitrust Law, Colum. L. Rev. 16, 25–26 (2016). He observes that this and associated approaches lead to false negatives and positives. See id. at 43.}
In any event the need to undertake some examination, however intense, implies that a rule of reason must be costlier to apply than a ban. Indeed, as intensity increases, driving error toward zero, the cost of a rule of reason must go to infinity, otherwise the rule would be capable of perfection.

The actual cost of applying either a ban or a rule of reason must vary depending on the conduct to which it is applied. It might be less expensive to catch an incompetently organized cartel in the act of fixing prices than to catch an expert and secretive organization. But for some category of conduct about which a court has only a general sense of good or bad, it seems reasonable to suppose that the court will also be unable to distinguish the cost of applying a particular rule to one subset of conduct from the cost of applying the same rule to another. Instead, the court will identify some average cost of extending a ban over a given area of conduct and an average cost of extending a rule of reason over a given area of conduct. These average costs must be constants because the court lacks the knowledge about the conduct at issue that it would need to predict how costs vary.

To return to the example above, suppose that the allowance, which covers 60% of the field of conduct, becomes a rule of reason. Assume further that the cost of a ban per percent of the entire field of conduct covered by it is $100 million and the cost of a rule of reason is $1 billion. Then the cost of the ban is its coverage area of 40% times $100 million, or $40 million, and the cost of the rule of reason is its coverage area of 60% times $1 billion, or $600 million. Thus, overall, the antitrust regime in this example would cost $640 million to enforce.

In practice, a court is unlikely to be able to put actual dollar values on these costs or to be interested in doing so. Instead, the court will be interested in whether a change of rules increases the cost of enforcement and the direction in which the areas of application of the rules must be adjusted to ensure that the budget remains balanced. This will become clear in the next sections.

payment settlements by proving the existence of a large reverse payment. Failure of a defendant to explain such a payment would result in liability without additional economic analysis of the costs and benefits of the settlement. See Fed. Trade Comm’n v. Actavis, 133 S. Ct. 2223, 2237 (2013) (“[A] reverse payment, where large and unjustified, can bring with it the risk of significant anticompetitive effects; one who makes such a payment may be unable to explain and to justify it; such a firm or individual may well possess market power derived from the patent; a court, by examining the size of the payment, may well be able to assess its likely anticompetitive effects along with its potential justifications without litigating the validity of the patent[.]”); Aaron Edlin et al., Activating Actavis, 28 ANTITRUST 16 (2013) (arguing that despite embracing a rule of reason standard for review of reverse payment settlements, the Court in FTC v. Actavis made settlements involving large reverse payments presumptively illegal).
This framework for thinking about error cost may be used to predict the effect on under- and over-enforcement of switching from one type of rule to another in a given coverage area.\footnote{This will allow me, in Part V.C, to consider the effect of rule changes implemented in a number of Supreme Court cases. I am not aware of any study that fully summarizes the effects of all possible rule changes, as I do here, or that establishes that accuracy requires an increase in enforcement budgets, as I do later in this section.} For example, converting a particular area from a ban to a rule of reason must reduce over-enforcement harm, since a rule of reason does a better job than a ban at identifying bad conduct, but it must also increase under-enforcement harm because it does not condemn all conduct, allowing some bad conduct to slip through the cracks. Figure 1 provides a graphical representation of error costs that can be used to trace the results of rule changes. Table 1 lists the effects of changes between all the rules. It is evident from it that all changes from one rule to another involve a tradeoff between under- and over-enforcement harm.\footnote{Cf. Baker, supra note 1, at 2185 (“The rule modifications addressed that problem by reducing the risk of false convictions. In accomplishing that end, they systematically accepted a greater risk of false acquittals. As a result, the risk that firms would exercise market power has likely increased.”) (footnote omitted).}

This conclusion arises purely because bans and allowances are able to eliminate all of one type of error, whereas rules of reason have a little of both. As a result, moving from a single rule to a rule of reason, or from a rule of reason to a single rule, in whole or part, cannot reduce both types of error with respect to that part. Swapping bans and allowances directly does no better, because doing so merely swaps over- and under-enforcement error.\footnote{This result holds regardless whether a rule of reason inflicts equal shares of possible under- and over-enforcement harm. Suppose, for example, that a rule of reason inflicts no under-enforcement harm, but only over-enforcement harm. A switch to a rule of reason from a ban would create no under-enforcement harm, but also could not reduce the amount of under-enforcement harm, as required for an increase in accuracy.}

The framework also establishes that accuracy, in the sense of a reduction in both under- and over-enforcement harm, cannot be achieved without an increase in the amount spent on enforcement. Consider the tradeoff in under- and over-enforcement harm associated with shifting the rule in a particular category away from a ban without changing enforcement cost. I call such a change a “budget-neutral” move. Budget-neutral reductions in over-enforcement harm lead to positive, but less than equal, increases in under-enforcement harm.\footnote{A more complete explanation of the results described in this Part may be found in the Appendix.} The only way to bring about a budget-neutral reduction in over-enforcement harm is to abandon a ban. When this is done, the
coverage area of the ban must be divided between rules of reason and allowances. The savings from the removal of the ban go to fund the new rule of reason, but because a rule of reason is more expensive than a ban, the funds cannot pay for the entire area of the ban to be replaced with the rule of reason. The part that cannot be covered with the rule of reason is made subject to an allowance. The old ban inflicted only over-enforcement harm, but the new rule of reason contributes less such harm and the new allowance none, so over-enforcement must fall. The old ban contributed no under-enforcement harm, but both the rule of reason and the allowance contribute some, so under-enforcement must increase.

Because there is a tradeoff between over-enforcement harm and under-enforcement harm for budget-neutral changes in error, reductions in over-enforcement harm that do not increase under-enforcement harm require a budget increase. Taken together with the fact that increasing accuracy by the alternative route of increasing rule of reason intensity also drives up cost, this implies that greater accuracy is in general only possible at greater cost.

C. Effects of a Budget Constraint

I observed above that enforcement budgets matter because rule changes that enforcers cannot afford cause them to engage in self-help by ceasing to enforce rules in certain areas of the field of conduct, which amounts to de facto imposition of allowances. I show in Part III that enforcement budgets have effectively been declining for generations and indeed do not automatically adjust to accommodate changes in cost. My framework predicts the effects self-help by enforcers when rule changes are ordered by the courts without attention to the existence of an enforcement budget constraint.

Because rules of reason are the most costly rules, conversion of other rules to them increases enforcement cost. When a rule change drives up cost, further rule changes must be made to bring cost back to budget. For example, a change from a ban to a rule of reason, which drives up cost, must be met by a change from a rule of reason back to a ban, or a change from a ban or rule of reason to an allowance, or a combination thereof, in order to drive cost back down. The coverage of the correcting rules must be chosen perfectly to hit the budget, but reduce costs no further. Similarly, when a rule change drives down cost, changes must be made to raise cost back to the budget limit.

Courts do not generally execute such cost adjustments. The case-by-case nature of adjudication makes it difficult for them to change many rules at once.56 Even if it were easy to do so, courts rarely consider the budgets of

56 Michael Abramowicz & Maxwell Stearns, Defining Dicta, 57 STAN. L. REV. 953, 1019
enforcers and generally do not craft the scope of the rule changes that they implement with enforcement budgets in mind. Instead, courts leave it to enforcers to cope with budget consequences. Enforcers respond to excessive costs by ignoring some cases, which amounts to transforming some categories into allowances. Enforcers respond to insufficient costs by ramping up enforcement in previously-under-enforced areas, which amounts to transforming some allowances into bans or rules of reason. Unlike courts,

(2005) (“Courts inevitably make positive law, but . . . individual judges are subject to important normative constraints in undertaking that task . . . . [J]udges are randomly selected to hear cases and to resolve the issues presented by those cases. And because cases arise from circumstances beyond the control of the individual judge, any judge’s ability to determine which issues to resolve is inherently limited.”); Baxter, supra note 12, at 672–73 (“Unlike Congress, the courts have only limited discretion in fashioning their lawmaking agenda.”).

57 Courts do sometimes express concern about high litigation cost, but they never seem to recognize that high cost can lead to under-enforcement or a tradeoff between enforcement in different areas of law. See, e.g., Fed. Trade Comm’n v. Actavis, 133 S.Ct. 2223, 2234 (2013) (worrying that litigation of patent validity as part of regulation of reverse payment patent settlements will prove “time consuming, complex, and expensive”). Thus the Court has long worried about the high cost of implementing a rule of reason. See, e.g., Northern Pacific R.R. Co. v. United States, 356 U.S. 1, 5 (1958) (recommending per se rules over rules of reason because a per se rule “avoids the necessity for an incredibly complicated and prolonged economic investigation into the entire history of the industry involved, as well as related industries, in an effort to determine at large whether a particular restraint has been unreasonable”); FTC v. Actavis, 133 S.Ct. at 2234, 2238 (responding to concerns about the expense of rule of reason approach to reverse payment patent settlements by holding that “trial courts can structure antitrust litigation so as to avoid . . . consideration of every possible fact or theory irrespective of the minimal light it may shed . . . .”); Leegin Creative Leather Products v. PSKS, Inc., 551 U.S. 877, 894–95 (2007) (refusing to continue to impose a per se rule of illegality solely due to the lower “administrative cost” of a per se rule relative to a rule of reason). But courts have not taken the additional step of considering how imposing the rule will cause enforcers to reduce enforcement under the constraint of a fixed budget.

58 Baker & Salop, supra note 23, at 18 (“Because every enforcement action has an opportunity cost, the agencies limit the intensity of their enforcement efforts and have to pick and choose which matters to pursue. They similarly are constrained in their ability to litigate multiple cases against deep-pocketed defendants, which may lead them to accept weaker settlements. Private plaintiffs add additional enforcement capacity, but they cannot employ the investigative tools available to the government, so they have less ability to uncover and challenge many types of anticompetitive conduct.”); Baxter, supra note 12, at 661 (then-head of the Antitrust Division of the Department of Justice arguing that fully enforcing the antitrust laws “would require the Division to shoulder obligations that, given its limited resources, it could not possibly discharge in an effective manner . . . .”).

59 It is difficult to verify the existence of a positive relationship between enforcement budget and enforcement intensity. There is a substantial literature studying the volume and type of cases filed by antitrust enforcers. See, e.g., Richard A. Posner, A Statistical Study of Antitrust Enforcement, 13 J. L. & ECON. 365 (1970) (initiating it). It is of limited use in determining enforcement intensity because enforcement includes both investigation and prosecution. Nonetheless, it suggests a positive relationship. See, e.g., Vivek Ghosal & Joseph Gallo, The
however, enforcers may only make changes to and from allowances. They cannot substitute rules of reason for bans or bans for rules of reason, as such changes are not a matter of the level of enforcement, but rather of the applicable legal standard, which is controlled by the courts.60

The effects of rule changes, net of the adjustments required to keep enforcement on budget, are listed in Table 1. Of particular note is the effect of a move from a ban to a rule of reason. Because enforcers cannot turn rules of reason into bans, they are unable fully to undo the effects of this change. They can only reduce costs by transforming rules of reason or bans into allowances, or engaging in a combination of the two, which drives the economy further in the direction of under-enforcement. So a budget constraint amplifies the laissez faire effect of a move to a rule of reason. Any move to or from an allowance can, however, be fully undone because enforcers can impose or remove allowances on areas covered by the same type of rule in response, leaving the amount of under- and over-enforcement harm unchanged. But they do not have to respond this way. Instead, they can impose or remove allowances on the other type of rule to stay on budget, thereby creating different levels of under- and over-enforcement harm. The table lists the direction of these changes in harm, but to indicate that enforcers might also simply undo the change in the rule, it lists these directions as “weak”.

The budget constraint can lead to quite counterintuitive results. Absent a budget constraint, one might expect a move from an allowance to a rule of reason to reduce under-enforcement harm, because the move involves subjecting a new practice to antitrust scrutiny. But, forced to respond to a budget constraint by subjecting some areas of conduct to allowance, enforcers might turn a ban in another area into an allowance. Because a ban inflicts no under-enforcement harm, but an allowance the greatest possible, the reductions in under-enforcement brought about by the adoption of the rule of reason are overwhelmed by the increases brought about by the adoption of the allowance by enforcers, and the net effect is to increase under-enforcement. Similarly, a move in the other direction from a rule of reason to an allowance can be countered by a conversion of an allowance into a ban.

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60 I believe I am the first to recognize this limitation.
which has the net effect of increasing over-enforcement harm, contrary to intuition. In Part V.C, I apply the error cost effects of rule changes listed in Table 1 to show how actual rule changes imposed by the Supreme Court in recent decades may have had such counterintuitive effects.

**D. The Optimal Rule**

The framework for error cost analysis that I have developed reveals three circumstances in which imposing a ban on conduct reduces error costs, even when it is known that some over-enforcement will result and so some good conduct will be condemned.61

1. **Rampant Bad Conduct**

   When the amount of good conduct is thought to be very low, it is optimal to ban everything. The value of bad conduct in the field is then so large relative to good conduct that the small increase in under-enforcement error associated with subjecting even a small area of conduct to a rule of reason so swamps any gains from the accompanying reduction in over-enforcement error that overall error costs increase. Note that the budget constraint pays no role in this case. The enforcement budget may be able to support imposition of a rule of reason on the entire field. Doing so would increase error costs, however, because the costs of the under-enforcement that would result, however small, are just too high.

2. **Fixed Rule of Reason Intensity**

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61 I take the goal of antitrust to be to expend available enforcement resources on minimizing the sum of under- and over-enforcement costs, which is to say, error cost. In economics parlance, the goal is to minimize error cost subject to the enforcement budget constraint. When I characterize a rule as optimal, I mean that it meets this standard. The optimal enforcement literature generally seeks to maximize some measure of value net of enforcement costs. Under this approach, it would be appropriate for me to maximize consumer value net of enforcement cost. See, e.g., Amitai Aviram, *Allocating Regulatory Resources*, 37 J. CORP. L. 13, 742–43 (2012) (“[O]ptimal deterrence models . . . identify the optimal point as the one where the marginal cost of additional enforcement equals the marginal utility to society from preventing . . . future violations of the law”). Indeed, Kwak maximizes social welfare net of cost in modeling antitrust rules of reason. Kwak, *supra* note 7. I do not, however, pursue that project here. My assumption is that enforcers believe that consumer welfare should be maximized regardless of cost; so they always spend their budgets on enforcement, even if they might obtain a greater surplus of consumer welfare net of enforcement costs by spending less. Alternatively, my assumption is that the U.S. Congress shoulders the burden of maximizing social value net of costs and allocates enforcement budgets accordingly (including for private enforcers by manipulating damages rules), with the expectation that enforcers will spend their entire budgets.
When the enforcement budget cannot cover the cost of a full rule of reason for a given rule of reason intensity, the optimal mix of antitrust rules is either no allowances or no bans. There is no middle ground. Under a policy of no allowances, all acts that fall within the ambit of the antitrust laws are either banned or subject to a rule of reason. This extreme is optimal when bad conduct is relatively large and rules of reason relatively expensive. When the amount of bad conduct in the field of conduct is large relative to the good conduct in it, the harm inflicted by converting a ban to a rule of reason and an allowance in a budget-neutral way is large, because a move to rules of reason and allowances increases under-enforcement, and that is relatively costly when bad conduct predominates. Whether overall error costs, including both under- and over-enforcement harm, will rise depends on the magnitude of the increase in under-enforcement, which in turn is determined by the size of the extra enforcement cost associated with substituting a rule of reason for a ban. If the cost is high, then the area that can be converted to a rule of reason will be small and most of the formerly banned area will become subject to an allowance, driving up under-enforcement and bringing about a net gain in error costs. The optimal rule will be to subject as much of the field of conduct to rules of reason and the rest to bans.

The optimal division of the field of conduct between bans and rules of reason will have nothing to do with the goodness or badness of the underlying conduct, because those characteristics cannot be identified. For example, if the cost difference between the rule of reason and ban and the enforcement budget determine that, say, 30% of the conduct should be banned, it does not matter which 30%. Suppose the conduct is cartelization. If 30% of prospective cartels have left-handed CEOs, and a different 30% have headquarters with more than 100 automatic coffeemakers, it would be just as optimal from the perspective of error cost minimization to make left-handed cartels illegal as to make caffeinated cartels illegal. The arbitrariness of the rule is precisely the source of its value in this context. Reducing arbitrariness would require case-by-case investigation, which would amount to imposing a rule of reason.  

3. Varying Rule of Reason Intensity

In the previous case, I assumed, implicitly, that rule of reason intensity is fixed and that full rule of reason coverage is not affordable. If both assumptions are abandoned, a partial ban may still reduce error costs. Suppose that the enforcement budget is just large enough to permit

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62 For an example of a case in which the U.S. Supreme Court objected to such arbitrariness, see infra Part V.C.
imposition of a rule of reason on all conduct at the prevailing level of rule of reason intensity. Unless the overall possible under-enforcement harm is very large or very small relative to overall possible over-enforcement harm, in which case a full ban or full allowance and no rule of reason is optimal, as described in Part II.D.1, error cost may be reduced by imposing a full rule of reason, as this substitutes the lower rule of reason error cost regime for higher error cost bans or allowances. Because rule of reason intensity is now not fixed, however, this imposition of a full rule of reason does not end the story.

The next question is whether rule of reason intensity may be increased to further the reduction in error costs. Additional funds may be freed up to spend on increasing rule of reason intensity by converting some conduct from a rule of reason to a ban, which has a lower enforcement cost. These enforcement cost savings exact a price in the form of the greater over-enforcement costs associated with a ban. But paying this price will be worthwhile if the error cost reductions in the rule of reason coverage area that are brought about by the greater rule of reason intensity are large enough.63

If they are, then rule of reason intensity will increase. Full rule of reason coverage will not be affordable at the new rule of reason intensity. But error cost will be lower than for full rule of reason coverage at the old rule of reason intensity. I note that the existence of a budget constraint is relevant in this case, even though initially it is sufficient to cover the cost of a full rule of reason. The constraint ensures that rule of reason intensity cannot be increased without substitutions of some bans for rules of reason. I also note that as in the case in Part II.D.2, in which it is also optimal to divide the conduct at issue between a ban and a rule of reason, the line between conduct subject to one rule or the other must be drawn arbitrarily.

III. A MACRO PERSPECTIVE

It is tempting to apply the framework just developed to the full sweep of business practices that come under antitrust scrutiny. Doing so would permit me to tell a story about the trajectory of the entire antitrust enterprise from its inception to the present day. To do this, it is necessary to believe that the character of the entirety of conduct that can be subject to antitrust, which falls into the general categories of collusion, exclusion, or merger, is unknown to

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63 For ease of exposition, I developed this argument by presupposing that rule of reason coverage is initially full. But the argument applies regardless whether this is the case. If rule of reason intensity is increased by too little, for example, relative to the intensity at which there is full coverage, and this situation of insufficient increase, in which rule of reason coverage is no longer full, is taken to be the new starting point, then it is evident that a further increase in intensity, and reduction in rule of reason coverage, is optimal.
antitrust regulation.\textsuperscript{64} That is, antitrust cannot really identify any particular bit of conduct as bad, or any part as good, and so all it has to work with in determining the error costs of its rules is some notion regarding whether these categories of conduct are mostly good or mostly bad. I shall outline a case for this attitude presently. But assuming it for now, here is the story that may be told about the history of antitrust.

The starting point, prior to passage of the Sherman Act in 1890, is a zero budget and therefore laissez faire.\textsuperscript{65} The mix of rules employed by antitrust fluctuated thereafter,\textsuperscript{66} but by the 1960s antitrust appeared to embrace the notion that most antitrust-relevant conduct is bad. Accordingly, antitrust at that time contained mostly per se rules and rules of reason, but few allowances.\textsuperscript{67} The triumph of the Chicago School starting in the 1970s amounted to an embrace of the notion that most antitrust-relevant conduct is good, or at least less bad than what was previously thought. Accordingly, antitrust saw the replacement of many bans with rules of reason and rules of reason with allowances, consistent with a policy of no bans.\textsuperscript{68} This pushed down over-enforcement, but also pushed up under-enforcement, moving the economy toward greater laissez faire along a path consistent with its budget constraint.\textsuperscript{69} The persistence of bans in some areas suggests that the shift

\textsuperscript{64} For antitrust’s three categories of relevant conduct, see supra note 19.

\textsuperscript{65} The common law allowed for some enforcement against cartels and monopolies, but I assume it was small. See Herbert Hovenkamp, \textit{The Sherman Act and the Classical Theory of Competition}, 74 Iowa L. Rev. 1019, 1023–38 (1988).


\textsuperscript{67} This claim is really a function of the definition of the antitrust universe. If one thinks of the antitrust universe as including all conduct subject to bans or rules of reason in, say, 1970, then of course none of that conduct was allowed at that time. Part V shows that in subsequent years part of this conduct has become subject to allowance. I note that Part V.C.3 describes a conversion of an allowance to a rule of reason; this should not be possible if the antitrust universe is defined to be conduct subject to bans or rules of reason in 1970. However, the reverse payment settlement practice at issue there probably would have been banned as price fixing under the severe treatment of patent that prevailed at the time. Hovenkamp, supra note 5, at 263, 270 (remarking that “historically . . . patents were a ‘suspect class,’ and . . . arrangements involving patents were to be treated with greater hostility than would be applied to similar practices not involving patents” but also observing that today a reverse payment settlement “would be per se unlawful under the antitrust laws but for the fact that the agreement is part of a patent settlement”). The story of reverse payments is probably best characterized as one of conversion from ban to allowance and then to rule of reason. In Part V.C.3, I discuss only the last step.

\textsuperscript{68} I provide a partial accounting of the doctrinal shifts in Part V. A fuller accounting may be gleaned from other sources. See, e.g., Devlin & Jacobs, supra note 16, at 84–85; Baker, supra note 1, at 2184–85; Baker, supra note 2, at 3–4.

\textsuperscript{69} See supra Part II.C.
toward a no bans policy is not complete.\footnote{According to results in Part II.D.2 for the case of a budget constraint and fixed rule of reason intensity, the belief that the cost of rule of reason enforcement relative to that of a ban has fallen might also explain the shift from no allowances to no bans.}

This analysis falls apart if it is thought that judges know or have been learning how to identify good and bad antitrust conduct. In that case, shifts to allowances could reflect the identification of particular areas of purely good conduct, rather than shifts in opinion regarding the character of antitrust-relevant conduct as a whole. It is possible to make the case that this is not so, and antitrust has merely been groping in the dark. The case would proceed as follows.

The courts often have strong opinions about the harmfulness of the categories of practices under consideration in any given case.\footnote{For example, the Court professes to apply a ban on price fixing because claims that price fixing can sometimes benefit consumers are, in its view “so unlikely to prove significant in any particular case.” Arizona v. Maricopa County Medical Soc., 457 U.S. 332, 351 (1982). Commentators are also quite sanguine about the ability of courts to distinguish good and bad. See, e.g., Stucke, supra note 23, at 1483–85 (arguing that the courts should create “differentiated” rules that favor plaintiffs when “available empirical evidence” suggests that a practice is “likely” to be anticompetitive and that favor defendants otherwise).} But it is in fact difficult to identify a durable consensus regarding the harmfulness of any practice covered by the antitrust laws. Consider the following examples. While the courts are unanimous in their view that naked price fixing is harmful,\footnote{Arizona v. Maricopa County Medical Soc., 457 U.S. at 351.} economists are not so sure.\footnote{See MICHAEL D. WHINSTON, LECTURES ON ANTITRUST ECONOMICS 15 (2008) (“[T]he empirical evidence concerning price fixing’s actual effects is surprisingly limited and mixed in its findings.”).} Resale price maintenance, predatory pricing, tying, and mergers to market shares in excess of 30% have all gone from bad to good in the eyes of the courts in the space of a generation. Between the late 1950s and middle 1970s, eminent antitrust scholars supported a national deconcentration campaign.\footnote{See, e.g., INDUSTRIAL CONCENTRATION: THE NEW LEARNING (Harvey J. Goldschmid et al. eds., 1974); CARL KAYSEN & DONALD F. TURNER, ANTITRUST POLICY: AN ECONOMIC AND LEGAL ANALYSIS (1959).} Today the Supreme Court celebrates the virtues of monopoly.\footnote{Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 407 (2004) (“The opportunity to charge monopoly prices—at least for a short period—is what attracts ‘business acumen’ in the first place; it induces risk taking that produces innovation and economic growth. To safeguard the incentive to innovate, the possession of monopoly power will not be found unlawful unless it is accompanied by an element of anticompetitive conduct.”).} If antitrust cannot make up its mind, why suppose that it is operating on any more than a general sense of how much bad and good is to be found within the ambit of antitrust-relevant conduct as a whole.
Starting in the 1970s, antitrust has embraced a presumption in favor of a rule of reason. If the proliferation of rules of reason over this period has taken place under a budget constraint, then the analysis of the effects of rule changes under a constraint that I identified in Part II.D.2 may be used to determine the consequences. The existence of a constraint depends on whether enforcement cost was at budget at the time that the changes started to occur and whether enforcement budgets tend to expand to accommodate more expensive rules. I use time series data on Antitrust Division and FTC antitrust enforcement budgets to show that effective budgets fell during this period. Although I have no data on private enforcement budgets, I argue that they must have fallen as well. This suggests that the move to rules of reason took place in the face of a budget constraint.

Federal enforcement budgets have increased in real terms since the 1970s. This does not, however, establish that antitrust budgets could absorb the higher cost of rules of reason, because the amount of conduct that antitrust must monitor in order to enforce existing rules has also grown substantially over this period. As the economy grows, the amount of conduct that falls within the ambit of any given antitrust rule must grow as well. A larger economy means more transactions the prices of which may be fixed, more business that may be foreclosed through exclusive dealing, and more markets that may be dominated through merger, for example. If enforcement budgets fail to grow, then enforcers must reduce the share of conduct falling within a given rule that they actually monitor. Thus a static enforcement budget implies a natural growth in allowances over time.

To account for this effect, I discount enforcement budgets by the real growth rate of the U.S. economy. Figure 2 shows the result. It shows that effective antitrust enforcement budgets peaked in the 1940s, reached a new low in the 1970s, and have declined slightly since then. To account for the possibility that progress in information technology in recent decades may have increased enforcement productivity, reducing the need for budget increases to keep up with economic growth, I discount economic growth by the average rate of growth of total factor productivity in federal government

\[ \text{76 Part V.A.} \]

\[ \text{77 Kwoka also worries that enforcement budgets lag economic growth. Kwoka, Jr., supra note 58, at 296 (“[T]he increase in antitrust enforcement resources over the past thirty years has been far more modest than most measures of economic activity or of events such as mergers that are reviewed by the agencies.”).} \]
administration from 1960 to the present,\textsuperscript{78} the effect is minimal and is incorporated in Figure 2.

The ebb and flow of the effective budget tracks stylized facts about enforcement history. The effective budget was high in the second decade of the 20\textsuperscript{th} century when antitrust was a major issue in a presidential election and the FTC came into being.\textsuperscript{79} It then fell to a trough in the 1930s, when it was thought for a time that concentration is efficient.\textsuperscript{80} This policy reversed with the appointment of Thurman Arnold to head the Antitrust Division, and by the 1940s budgets reflected the renewed interest in enforcement.\textsuperscript{81} Budgets remained stable from the 1950s to the 1970s, during antitrust’s structural period.\textsuperscript{82} Then in the 1970s, the Chicago School succeeded at arguing that it is firm conduct, and not market structure, that determines whether markets are competitive.\textsuperscript{83} This suggested that a substantial amount of then-banned conduct was good. Accordingly, effective enforcement budgets declined to the current trough. This is consistent with data showing that concentration has increased substantially since at least the 1990s and that corporate profits are high, while corporate investment spending is low.\textsuperscript{84} Another striking feature of Figure 2 is that effective enforcement budgets have never been lower than in the past 40 years. The overall downward trend in effective enforcement, which took place even during periods of strong

\textsuperscript{78} Dale W. Jorgenson et al., \textit{Information Technology and U.S. Productivity Growth: Evidence from a Prototype Industry Production Account}, 36 J. PRODUCTIVITY ANALYSIS 159, 163–64, 168, 170 (2011) (discussing information technology innovation since 1960, characterizing federal government administration as an IT-using industry, and providing an average annual productivity growth rate for said industry). Kwoka considers whether enforcement productivity increases account for the failure of budgets to keep up with growth in economic activity and concludes that they do not. Kwoka, Jr., \textit{supra} note 58, at 296–97 (suggesting that “more talented staff, superior computing technologies, and procedures such as the Merger Guidelines that systemize analysis” might have increased enforcement productivity).

\textsuperscript{79} Hovenkamp, \textit{supra} note 5, at 66 (stating that there was “great interest in antitrust during the 1912 Presidential election” and that the Wilson administration created the FTC).

\textsuperscript{80} See \textit{id.} at 67 (observing that this view “temporarily won out during the New Deal” and “Roosevelt’s ‘Codes of Fair Competition’ virtually legalized various forms of collusion”).

\textsuperscript{81} See \textit{id.} (stating that “Roosevelt changed course” with the appointment of Thurman Arnold).

\textsuperscript{82} See Hovenkamp, \textit{supra} note 65, at 354–59 (describing the sometimes “harsh” antitrust rules of this period).

\textsuperscript{83} See \textit{id.} at 360–62.

\textsuperscript{84} See \textit{Too Much of a Good Thing}, \textit{Economist}, http://www.economist.com/news/briefing/21695385-profits-are-too-high-america-needs-giant-dose-competition-too-much-good-thing (observing that according to U.S. government data the average four-firm market share has increase by six percentage points since the late 1990s); Einer Elhauge, \textit{Horizontal Shareholding}, 129 HARV. L. REV. 1267, 1281–82 (2016) (observing that corporate profits are at their highest levels of the last sixty years but corporate profits were 10% higher in 2000 than in 2015).
interest in enforcement, suggests a failure of Congress to consider growth in the economy in setting budgets.

I do not consider data on private enforcement budgets, but doing so is probably not necessary. In order for private enforcement budgets to have overcome a constraint, they would have had to increase enough since the 1970s to compensate for the decline in federal enforcement budgets.\footnote{Cf. GAVIL ET AL., supra note 20, at 1134 (“If government enforcers devote fewer resources to investigating antitrust violations . . . those acts will reduce the likelihood that any particular violator will be detected and convicted. Unless the damages multiple [in private enforcement cases] is increased under such circumstances, the level of deterrence will be reduced.”).} One way in which this might happen would be if budgets were automatically to respond to rule changes. Private enforcement budgets should automatically expand or contract with rule changes, but not in all cases. Private enforcement budgets should respond to changes involving allowances. A shift from an allowance to a ban, for example, permits private plaintiffs to bring cases relating to a new area of conduct and obtain attorney’s fees and trebled damages.\footnote{15 U.S.C. § 15; see generally HOVENKAMP, supra note 5, at 652–54.} Plaintiff attorneys may use their fees and contingency shares of trebled damages to monitor compliance with the new rule and bring additional cases if necessary.\footnote{See Thomas E. Kauper & Edward A. Snyder, An Inquiry into the Efficiency of Private Antitrust Enforcement: Follow-on and Independently Initiated Cases Compared, 74 Geo. L.J 1163, 1220 (1985) (“[T]he rationale for a treble damages remedy encompasses not only the policies of compensation and deterrence, but also the need to provide incentives to private parties to encourage litigation to detect and prevent continuing violations.”); Warren F. Schwartz, An Overview of the Economics of Antitrust Enforcement, 68 Geo. L.J. 1075, 1092 (1980) (recognizing that the level of private damages determines the intensity of private enforcement); Spencer Weber Waller, The Incoherence of Punishment in Antitrust, 78 Chi.-Kent L. Rev. 207, 210–11 (2003) (noting use of contingency fee structure in private antitrust actions).} Thus a switch from a ban to a more expensive rule of reason will not drive up funding for plaintiff attorneys. Unless private plaintiff damages levels were already large enough to fund rule of reason cases, this automatic budget adjustment cannot have allowed plaintiff attorneys to pay for the new rules of reason, let alone cover the budget shortfall of federal enforcers.

The other way in which private enforcement might compensate for the federal shortfall would be if private damages levels were to rise across the board. But private damages levels have probably remained constant or fallen over the past 50 years.\footnote{A proposal to do that failed. See HOVENKAMP, supra note 5, at 721 & n.6 (noting that a Reagan Administration proposal to limit treble damages to violations of per se rules was never implemented and arguing that defeat was the right result).} And various scope-of-liability rules have made it
harder for private enforcement actions to go forward.\textsuperscript{90}

Of course, it is possible that enforcement budgets have always been large enough to absorb the cost of the application of rules of reason, even across the board, at least at the prevailing level of intensity of application of rules of reason.\textsuperscript{91} In this case the fact of a constant budget does not imply that there is a constraint. I reject this possibility. A truly adequate enforcement budget funds perfect enforcement. If a category of conduct is banned, no conduct within that category is ever engaged in without it coming to the attention of enforcers and resulting in a successful prosecution. If a category is subject to a rule of reason, all conduct within it is investigated and weighed for harm. There is no selective enforcement; enforcers need not impose any self-help allowances to meet their budgets. Surely antitrust enforcers lack the funds to monitor all business conduct. The imposition of self-help allowances, in the sense that all enforcers are constrained to pick and choose the categories of conduct that they scrutinize, is routine.\textsuperscript{92} There is a budget constraint, and, if anything, it has been tightening since the 1940s.\textsuperscript{93}

V. THE QUIXOTIC PURSUIT OF ACCURACY

A. The Rule of Reason Presumption

The hallmark of the demise of many antitrust bans in recent decades has been the belief of the U.S. Supreme Court that it can use a combination of per se rules that inflict no error costs and rules of reason to increase accuracy. This is reflected in its embrace of a presumption in favor of a rule of reason\textsuperscript{94} that can be overcome in favor of a per se rule only by a showing that error

\textsuperscript{90} See Edward D. Cavanagh, \textit{Detrebling Antitrust Damages: An Idea Whose Time Has Come}, 61 TUL. L. REV. 777, 778 (1986). In recent years, courts have taken a harder line on the measurement of damages. See GAVIL ET AL., supra note 20, at 1139 ([R]ecently, plaintiffs have faced increasingly skeptical courts in presenting their cases for damages.

\textsuperscript{91} For a discussion of rule of reason intensity, see supra note 50, and accompanying text.


\textsuperscript{93} Of course it may be optimal from the perspective of maximizing social welfare to starve enforcers of the resources they need to achieve perfect enforcement. The costs may outweigh the benefits of greater care. But that question is not relevant to my constrained maximization problem. See supra note 61.

\textsuperscript{94} See, e.g., Business Electronics Corp. v. Sharp Electronics Corp., 485 U.S. 717, 726 (1988) (stating that “there is a presumption in favor of a rule-of-reason standard”)}
costs under the per se rule are negligible.95

So far in this article, I have assumed that bans inflict under-enforcement harm and allowances inflict over-enforcement harm because the categories of conduct to which they apply are never drawn perfectly to cover only bad or good conduct, respectively. When the categories are drawn perfectly, there are no error costs because there is no good conduct for a ban to ban and no bad conduct for an allowance to allow. Courts participating in the removal of bans insist that categories be drawn perfectly before a ban or allowance may be applied, thereby ensuring that these rules can create no error costs.

Accordingly, the Court has converted a number of bans into rules of reason when it has discovered that the bans include some good conduct within their ambit in addition to bad.96 And it has converted at least one allowance to a rule of reason when it has found that bad, as well as good, conduct falls within its ambit.97 When it has converted other bans to allowances, it has done so claiming that only good conduct falls within their ambit.98 And when it has converted some rules of reason to allowances it has done so claiming that no bad conduct falls within their ambit.99

With one exception,100 these changes reduce over-enforcement. But the Court has not evinced a preference for under-enforcement over over-enforcement. Indeed, it generally converts bans that involve error costs to rules of reason instead of allowances,101 suggesting a desire to minimize under-enforcement. Instead, it seems unaware that a tradeoff exists between false positives and false negatives and to believe instead that its rule changes reduce both and therefore increase accuracy.

My model shows that a tradeoff exists. I apply my model by granting that the per se rules applied by the courts in fact have no error cost and then defining the antitrust universe to include only the conduct that the courts have subjected to a rule of reason.102 Whether this remaining conduct is bad or good is presumably unknown to the courts, otherwise they would have subjected it to per se rules, so it makes sense to proceed within the framework

95 See, e.g., id. (refusing to depart from the rule of reason presumption in favor of a ban because there had been no showing that the conduct in question “almost always tends to restrict competition and reduce output”).
96 Part V.C.1.
97 Part V.C.3.
98 Part V.C.2.
99 Part V.C.4.
100 Part V.C.4.
101 Part V.C.1.
102 If the per se rules embraced by the Court turn out to involve error costs after all, as seems likely, see Part V.C.1, then the ensuing discussion applies to the full universe of antitrust conduct.
that I developed in Part II. Because the antitrust universe now encompasses only this remaining conduct, possible under- and over-enforcement harm now are those harms associated only with this remaining conduct.\footnote{It seems reasonable to assume that they are in the same proportion to each other as they are when they represent harm for the entire antitrust universe. Even if the courts are able to identify good and bad conduct in imposing per se rules, there is no reason to suppose that they are better at identifying one type than another.}

The Court’s presumption in favor of a rule of reason whenever per se rules would inflict error costs amounts to the imposition of a blanket rule of reason within this area of conduct. I wish to understand the consequences of doing so. Suppose, first, that there is no budget constraint. If bad conduct within this area is very large relative to good conduct, the extra under-enforcement created by using rules of reason instead of bans inflicts large amounts of harm and error costs are minimized only by banning all of the conduct, even if this leads to false positives.\footnote{See supra Part II.D.1.} If possible under-enforcement harm is not very large, then a blanket rule of reason is optimal.

Suppose now that there is a budget constraint in the sense that enforcers cannot afford to impose only rules of reason, and that rule of reason intensity is fixed. I have shown that if bad conduct is thought to be pervasive relative to good conduct, or rules of reason costly relative to bans, then it is optimal to mix bans with rules of reason and eschew allowances entirely.\footnote{See supra Part II.D.2.} I have shown, further, that if courts fail to realize this and embrace only rules of reason, then enforcers respond by converting some rules to allowances, instead of bans, promoting laissez faire and failing to achieve optimality.\footnote{See supra Part II.C.}

Because there is a budget constraint,\footnote{I conclude that there is a budget constraint in Part III.} it follows from this analysis that in applying a rule of reason whenever per se rules would inflict error costs, the Court has moved the economy toward laissez faire. This policy is justified only if the Court believes that there is not too much bad conduct to be regulated by antitrust or rules of reason relative inexpensive.\footnote{It is possible, though unlikely, that the Court’s various rule conversions, taken together, result in a conversion of bans to rules of reason and allowances in the proportion required to effect a budget-neutral move.} Because the Court has not expressed this belief and seems unaware that it is promoting laissez faire, its embrace of a rule of reason presumption is troubling. It may be said that

\textit{The road to laissez faire is paved}
\textit{With error costs that can’t be saved.}
B. Per Se and Rule of Reason: A Difference in Kind

I have observed that a pillar of the presumption in favor of a rule of reason is the notion that the only legitimate per se rules are those that create no error costs. I call these “weak” per se rules. Because it creates no error, a weak per se rule is imposed within lines carefully drawn to exclude good or bad conduct and the framework for choosing rules that I developed in Part II does not apply. Thus a weak ban applies only to areas that contain no good conduct and a weak allowance only to areas that contain no bad conduct. It can be imposed only when the Court has knowledge regarding the character of conduct at issue, allowing it to distinguish bad from good. A strong per se rule is a ban or allowance as I have characterized these in my model. They are applied to areas that contain both good and bad conduct and they inflict error costs. They are appropriate when the court cannot distinguish between good and bad conduct within the category at issue, and knows only the relative amounts of good and bad in the conduct as a whole.

The observation, common in the reporters, that there is no difference in kind between a per se rule and a rule of reason applies only to weak per se rules. The idea is that both a rule of reason and a weak per se rule seek carefully to distinguish bad from good conduct and prosecute only the former, keeping error costs low. A weak per se rule is a rule of reason applied to a category of conduct that is so obviously bad or good, perhaps because courts have a long history reviewing it, that the case-by-case review for harm associated with a rule of reason is unnecessary and the entire category may be banned or allowed, as necessary, without any error cost. It is a rule of reason when a rule of reason is inexpensive to enforce.

An important lesson of my model is that there can be a role for both weak and strong per se rules in minimizing error costs. If the courts are certain that conduct is bad or good, then they of course should ban or allow it,

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109 See, e.g., National Collegiate Athletic Assn. v. Board of Regents of Univ. of Okla., 468 U.S. 85, 103-04 (1984) (“Per se rules are invoked when surrounding circumstances make the likelihood of anticompetitive conduct so great as to render unjustified further examination of the challenged conduct. But whether the ultimate finding is the product of a presumption or actual market analysis, the essential inquiry remains the same — whether or not the challenged restraint enhances competition.”); Spencer Weber Waller, Justice Stevens and the Rule of Reason, 61 SMU L. REV. 693 (2009) (tracing doctrinal origin of this “unitary” rule of reason theory to the work of Justice Stevens); Timothy J. Muris, The New Rule of Reason, 57 ANTITRUST L.J. 859 (1988) (marking its rise); POSNER, supra note 6, at 39–40.

110 See, e.g., California Dental Assn. v. FTC, 526 U.S. 756, 779–81 (1999); Leegin Creative Leather Products v. PSKS, Inc., 551 U.S. 877, 877–78 (2007) (“a per se rule is appropriate only after courts have had considerable experience with the type of restraint at issue . . . and only if they can predict with confidence that the restraint would be invalidated in all or almost all instances under the rule of reason”).
respectively. This increases accuracy, as the ban or allowance reduces either over- or under-enforcement without increasing the other. As the shift to rules of reason in recent decades shows, however, once all such opportunities for imposing weak per se rules have been exhausted, there still remain areas of conduct within the antitrust universe. I have shown that strong per se rules may be necessary to minimize error costs within these remaining areas, particularly in the presence of a budget constraint.

C. Application to Recent Rule Changes

I now apply my model to identify the consequences of a number of specific recent antitrust rule changes. The results are summarized in Table 2.

1. Bans to Rules of Reason

In recent years, the courts have converted a number of longstanding bans to rules of reason. As Table 1 shows, the effect is to move the economy toward laissez faire. Two concerns have appeared to motivate these conversions. First, the courts have embraced the weak ban as the only legitimate form of ban; in each case, they have concluded that the category of conduct at issue is not appropriate for a ban because it includes some good conduct. Second, the courts have seemed troubled by the arbitrariness of lines separating banned conduct from conduct subject to a rule of reason. I interpret this as a failure to understand the nature and value of strong per se rules. The cost advantage of a ban comes precisely from the indiscriminateness of its application.111

The most important abandonment of a ban in recent years is Leegin Creative Leather Products, Inc. v. PSKS, Inc.112 The Court there converted a ban on minimum resale price maintenance (“RPM”) into a rule of reason both on the ground that banning RPM would result in false positives113 and that it appeared arbitrary given that related practices, such as non-price vertical restraints, are allowed.114 The Court expressed no interest in promoting, and seemed unaware of, the laissez faire consequence of its ruling. Similarly, in Continental T.V., Inc. v. GTE Sylvania, Inc., the Court eliminated the ban on non-price vertical restraints because there was evidence that such restraints can benefit consumers.115 It recognized that there may be some false positives under a ban, but suggested that these must be negligible for a ban to be

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111 See supra Part II.D.2.
112 551 U.S. 877.
113 See id. at 894.
114 See id. at 900-03.
appropriate.\textsuperscript{116} And it thought that upholding a ban would be arbitrary where the only thing that could distinguish the restraints at issue from those that had been made exempt from the ban in an earlier case was that the retailer took no title to the goods at issue.\textsuperscript{117} The Court in Sylvania again seemed unaware of the laissez faire consequence of its ruling.

The movement in favor of converting strong per se rules to rules of reason is often traced\textsuperscript{118} to Broadcast Music, Inc. \textit{v.} Columbia Broadcasting System, Inc. ("BMI").\textsuperscript{119} Oddly enough, no conversion away from a strong per se rule actually occurred in that case. In BMI, the court refused to impose a ban on block licensing of copyrighted material that had until then been exempt from the antitrust laws.\textsuperscript{120} Thus there was no actual repudiation of a strong ban. The Court suggested that the price fixing category, which is subject to a strong ban, simply had never included block licensing.\textsuperscript{121} In deciding the case, however, the Court suggested that only weak bans are permitted\textsuperscript{122} and a ban would lead to false positives.\textsuperscript{123} Because commentators understood the ban on price fixing to apply to all horizontal agreements, they interpreted the Court’s refusal to apply it in BMI on the ground that it might lead to false positives as a repudiation of strong bans generally.\textsuperscript{124}

The Court may claim that per se rules must be weak, but this does not mean that the bans it continues to enforce actually have a negligible number of false positives. Indeed, there is reason to think that the ban on price fixing leads to a substantial number of false positives because it condemns even price fixing at low market shares and may promote investment by preventing ruinous competition.\textsuperscript{125} Existing bans, including the per se rule against price

\textsuperscript{116} See id. at 50 n. 16.
\textsuperscript{117} See id. at 54.
\textsuperscript{118} See, e.g., Muris, supra note 108, at 859–60 (describing BMI as the “most important” decision in the erosion of the distinction between per se rules and rules of reason).
\textsuperscript{119} 441 U.S. 1 (1979).
\textsuperscript{120} Id. at 10–14, 24–25.
\textsuperscript{121} Id. at 9 ("[I]t is necessary to characterize the challenged conduct as falling within or without that category of behavior to which we apply the label ‘per se price fixing.’ That will often, but not always, be a simple matter[.]”).
\textsuperscript{122} Id. at 7–8 (arguing that per se rules apply only where the practice at issue lacks “any redeeming virtue”)(internal citations omitted).
\textsuperscript{123} Id. at 24 ("[O]ver the years, and in the face of available alternatives, the blanket license has provided an acceptable mechanism for at least a large part of the market[.]”).
\textsuperscript{124} Muris, supra note 108, at 859–60 ("[T]he Court described the challenged conduct as an agreement among competitors to fix the price of their goods. Under the [traditional per se rule], the case would have been over[.]")
\textsuperscript{125} United States v. Socony-Vacuum Oil Co., 310 U.S. 150, 224 n. 59 (1940) ("[A] conspiracy to fix prices violates § 1 of the Act though no overt act is shown, though it is not established that the conspirators had the means available for accomplishment of their objective, and though the conspiracy embraced but a part of the interstate or foreign
fixing, are in jeopardy if the Court takes the no false positives requirement seriously. However, the Court has not gone on after BMI actually to repudiate the per se rule against price fixing, refusing in *Arizona v. Maricopa County Medical Society* to abandon the price fixing ban. In that case, the Court insisted that false positives remained “unlikely” while condemning an agreement that probably was good for consumers. It thereby affirmed a strong ban on price fixing by pretending that it is a weak ban. I read the reluctance of the Court to do away with the ban on price fixing as a tacit acknowledgement of the importance of strong per se rules and a suggestion that the Court has never intended to embrace a no bans policy even if its quixotic pursuit of accuracy has pushed the economy in that direction.

The language the Court uses when it rejects bans that are not weak per se rules comes from *Northern Pacific R.R. v. United States*. In that case, the Court banned a tie between land and the use of railroad services passing by the land. It stated that “there are certain agreements or practices which because of their pernicious effect on competition and lack of any redeeming virtue are conclusively presumed to be unreasonable.” This establishes that categories of conduct that are all bad must be banned. But it does not demand the inverse: that categories of conduct that are not all bad cannot ever be banned. Nonetheless, the courts use the language for this proposition.

There is a line of cases that seems more tolerant of false positives in per se rules that the Court might draw upon in owning up to the importance it places on strong per se rules. Although it quoted the *Northern Pacific* language, the Court in *United States v. Topco Associates, Inc.* argued against excessive concern for reducing false positives and that engaging in an economic analysis of harm is prohibitively costly for courts. In *United States v. Socony Vacuum Oil Co.*, the Court argued that price fixing is per se illegal, notwithstanding the possibility that it might remedy ruinous

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127 Id. at 351.
128 Id. at 342 (accepting that the agreement at issue saved consumers “millions of dollars”).
130 Id. at 5. *Northern Pacific* affirmed the per se rule against tying laid down in *International Salt Co. v. United States*, 332 U.S. 392, 395–96 (1947). That rule in turn was based on the belief at the time that tying can only harm competition and a ban therefore admits of no false positives. *See Standard Oil Co. of Cal. v. United States*, 337 U.S. 293, 304–06 (1949) (“Tying agreements serve hardly any purpose beyond the suppression of competition.”).
competition and thereby benefit consumers.\textsuperscript{132} The Court relied on\textsuperscript{133} \textit{United States v. Trenton Potteries Co.}, which rejected efficiency justifications for price fixing not on the ground that price fixing can never be beneficial but rather because it contains the potential for harm.\textsuperscript{134} The Court noted that “[t]hose who fixed reasonable prices today would perpetuate unreasonable prices tomorrow.”\textsuperscript{135} The understanding here was clearly that the rule would prohibit substantial beneficial behavior.

I argue in the next section that the courts have also effectively converted a ban on horizontal mergers into a rule of reason. Because this change was accompanied by a raising of the concentration threshold required for a merger to be challenged, and that amounts to a conversion of a ban to an allowance, I discuss this change alongside its partner in the next section.\textsuperscript{136}

2. Bans to Allowances

The courts have converted bans to allowances in at least some parts of the tying and merger categories. Unless no bad conduct falls within the new allowances, the effect is a weak move toward laissez faire, as shown in Table 1.

a. Tying

The level of market power in the tying product required for liability in tying cases has increased. I take this to shrink the coverage area of the traditional tying ban and to expand the coverage area of allowed conduct. Although it paid lip service to a market power requirement, the traditional rule banned tying. In practice, the market power requirement was never determinative.\textsuperscript{137} In \textit{Jefferson Parish Hospital v. Hyde}, the Court changed the rule by requiring market power in excess of 30\% as a condition for

\begin{itemize}
  \item \textsuperscript{132} United States v. Socony-Vacuum Oil Co., 310 U.S. 150, 218 (1940). See also Fashion Originators Guild v. Federal Trade Com’n, 114 F.2d 80, 85 (Circuit Court of Appeals, 2nd Circuit 1940) (“The fact that [the power over price generated by a conspiracy] is not at the moment exercised is no assurance that it may not be”).
  \item \textsuperscript{133} United States v. Socony-Vacuum Oil Co., 310 U.S. at 222–23.
  \item \textsuperscript{134} United States v. Trenton Potteries Co., 273 U.S. 392, 397–98 (1927).
  \item \textsuperscript{135} United States v. Socony-Vacuum Oil Co., 310 U.S. at 221.
  \item \textsuperscript{136} Part V.C.2.b.
  \item \textsuperscript{137} See, e.g., Northern Pacific R.R. Co. v. United States, 356 U.S. 1, 6–8 (1958) (condemning tying arrangements as illegal per se and arguing that the existence of tying arrangements itself shows the existence of “great power”); HOVENKAMP, supra note 5, at 439 (describing the traditional era of antitrust tying law as one “in which the market power requirement was simply not taken seriously”).
\end{itemize}
imposing a ban on tying.\textsuperscript{138} It did so for the purpose of reducing over-enforcement harm, arguing that economists had come to conclude that many tying arrangements are not harmful to consumers.\textsuperscript{139}

b. Horizontal Mergers

The courts allow horizontal mergers that result in market concentration levels below some threshold. They have always professed to subject mergers in excess of the threshold to a rule of reason, but until the 1970s, those mergers were banned in practice. Starting in the 1970s, the courts both raised the threshold and converted the ban into a rule of reason. Thus it turned a ban into an allowance for smaller mergers and into a rule of reason for larger ones.

The threshold was once no higher than the creation of a four firm concentration ratio of 70%.\textsuperscript{140} In \textit{United States v. Philadelphia National Bank}, the Court imposed a rebuttable presumption that a merger meeting concentration thresholds violates antitrust law.\textsuperscript{141} In practice, as Justice Stewart famously observed, the rule was that “the Government always wins” in merger cases, meaning that the presumption probably was not rebuttable in fact, but acted rather as a ban.\textsuperscript{142}

The movement away from bans that started in the 1970s brought two main changes to merger law. First, it reduced the set of mergers subject to antitrust review by switching the measure of concentration from the four-firm concentration ratio to the narrower HHI\textsuperscript{143} and progressively raising

\textsuperscript{138} Jefferson Parish Hospital Dist. No. 2 v. Hyde, 466 U.S. 2, 26–27 (1984) (concluding that there was insufficient market power to justify imposition of the per se rule against tying where 70% of the tying market was not controlled by defendant); HOVENKAMP, supra note 5, at 440 (“The \textit{Jefferson Parish} decision has had a large impact on the law of tying arrangements . . . . Recent cases have generally refused to condemn tying arrangements on market shares smaller than 30% of the tying product market.”).


\textsuperscript{140} HOVENKAMP, supra note 5, at 566 (stating, as a generalization from many sources, that ratios above 40% were potentially illegal and above 70% definitely illegal).


\textsuperscript{142} United States v. Von’s Grocery Co., 384 U.S. 270, 301 (1966) (Stewart, J., dissenting); HOVENKAMP, supra note 5, at 544 (observing that under the old approach to merger law, it was thought that “high concentration entailed poor performance” whereas “the new approach tends to view high concentration as merely a prerequisite for poor performance.”); DANIEL J. GIFFORD & ROBERT T. KUDRLE, \textit{THE ATLANTIC DIVIDE IN ANTITRUST AN EXAMINATION OF US AND EU COMPETITION POLICY} 6 (2015) (stating that in the 1960s the Supreme Court “virtually barred all horizontal mergers by companies of any significant size”).

\textsuperscript{143} See HOVENKAMP, supra note 5, at 566–67 (observing that a single four firm concentration ratio leads to a range of HHIs, from low to high, depending on the relative sizes of the firms
concentration thresholds under the new measure. A striking consequence is that whereas a merger to 8% share was once condemned, enforcers now only challenge mergers that take the number of firms in a market to three or fewer. Second, it imposed a rule of reason on mergers that meet the threshold. Meeting the threshold ceased immediately to trigger liability and instead became only one datum among many in determining whether a merger has anticompetitive effects. A merger that exceeds the threshold might now escape scrutiny, for example, when changing market conditions suggest that concentration will fall in the future.

c. Vertical Mergers

Vertical mergers that foreclosed in excess of 15% of the market, and probably even less, were once banned. Probably all vertical mergers are now effectively allowed because they are now thought to benefit consumers.

3. Allowance to Rule of Reason

in the market).

144 See id. at 544, 571 (stating that the Department of Justice and Federal Trade Commission have in their enforcement guidelines raised the threshold over time and that “[m]ergers in the 1960s were condemned on much smaller market shares and in much less concentrated markets than would be required today”).


146 GAVIL ET AL., supra note 20, at 454.

147 Id. at 451 (stating that in the 1970s appeals courts started “to permit a wide-ranging analysis of whether market shares accurately reflect the merging firms’ ability to compete”); HOVENKAMP, supra note 5, at 573 (“Market delineation plays a smaller role in current enforcement than it once did.”); cf. id. at 571 (“Both concentration measures and estimates of market share are generalized attempts to predict the likelihood of anticompetitive behavior in a market.”).


149 HOVENKAMP, supra note 5, at 430 (“foreclosure of 15% was generally considered illegal”); Brown Shoe Co. v. United States, 370 U.S. 294, 327, 332–34 (1962) (condemning vertical merger that would foreclose about 5% of the market).

150 HOVENKAMP, supra note 5, at 430 (“Prevailing judicial opinion now seems to be that vertical mergers should be condemned only in the most extreme circumstances.”); Reazin v. Blue Cross & Blue Shield of Kansas, Inc., 663 F. Supp. 1360, 1489 (D. Kan. 1987) (“[V]ertical integration is not an unlawful . . . category under the antitrust laws.”).

151 See, e.g., Alberta Gas Chemicals v. EL Du Pont De Nemours, 826 F.2d 1235, 1244 (3d Cir. 1987) (noting that “respected scholars question the anticompetitive effects of vertical mergers in general” in rejecting a challenge to a vertical merger); HOVENKAMP, supra note 5, at 425 (lamenting the harsh historical treatment of vertical mergers given their “extraordinary potential for creating efficiency and limited threat of economic harm”).
The presumption in favor of a rule of reason leads courts to increase laissez faire even when they think that they are increasing the coverage of the antitrust laws. Table 1 shows that when budget constraints are taken into account, imposition of a rule of reason can never increase over-enforcement. This result is counterintuitive in the case in which a rule of reason is imposed over an allowance, because the imposition of regulation would seem to expand antitrust liability. It fails to do so, however, because imposition of a rule of reason puts enforcers over-budget, causing them to compensate by imposing allowances. This may either return error costs to their initial values of under- and over-enforcement or drive it toward greater under-enforcement if the new allowances are imposed over bans.

Commentators supportive of greater antitrust liability have hailed the Court’s decision in FTC v. Actavis, not realizing, perhaps, that the net effect, at best, is no overall change in antitrust enforcement and, at worst, more laissez faire. In that case, the Court considered how to treat the category of cases involving reverse payment settlements of drug litigation under Paragraph IV of the Hatch-Waxman Act. The Court decided to replace allowance of these settlements with a rule of reason. The continuation of reverse payment enforcement actions after Actavis is no argument that the budget constraint does not apply. Given a constant enforcement budget, resources spent on those actions must be resources diverted from other actions.

Table 1 shows that, if the Court wishes to use reverse payment settlements to shift the economy in the direction of greater liability, it must ban them. Because some reverse payment settlements benefit consumers, the ban must be a strong per se rule. In keeping with the general judicial

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152 133 S.Ct. 2223 (2013).
155 FTC v. Actavis, 133 S.Ct. at 2234, 2237 (rejecting appeals court view that reverse payment settlements are immune from antitrust scrutiny and subjecting them to a rule of reason).
misunderstanding of the utility of strong per se rules, the Court in Actavis rejected a ban on reverse payment settlements on the ground that it might lead to false positives, without considering the reduction in false negatives promised by a ban.158

4. Rules of Reason to Allowances

The courts have converted rules of reason to allowances in the exclusive dealing, refusal to deal, and predatory pricing categories. They have generally claimed to do so in the interest of reducing false positives. At least one court opining on refusals to deal has expressed a desire to increase laissez faire as well. As shown in Table 1, converting rules of reason to allowances leads to the opposite result, however. Transforming rules of reason to allowances frees up enforcement resources that enforcers may use to reduce non-enforcement in other categories of behavior. As described above, this can either negate the effect of the substitution, or, if enforcers start to enforce more bans, drive the economy toward greater liability and increase false positives. This effect occurs regardless whether any bad conduct falls within the new allowances created by the courts (i.e., regardless whether the allowances are weak per se rules). It holds so long as there remain strong bans for which enforcers may ramp up enforcement with their savings from the conversion to allowances.

a. Exclusive Dealing

I take the raising of the foreclosure percentage required to trigger rule of reason scrutiny in exclusive dealing cases to wreak a shrinking of the coverage area of a rule of reason and a concomitant expanding of the coverage area of an allowance. The courts once subjected exclusive dealing contracts that foreclose more than 7% of a market to a rule of reason.159 In Jefferson Parish, a concurrence suggested that 30% foreclosure is insufficient because in the view of the concurring justices exclusive dealing contracts in relatively competitive markets are good for consumers.160

reverse payment settlements benefit consumers).

See FTC v. Actavis, 133 S.Ct. at 2237 (declining to ban reverse payment settlements “because the likelihood of a reverse payment bringing about anticompetitive effects depends upon its size . . . and the lack of any other convincing justification”).

See Standard Oil Co. of Cal. v. United States, 337 U.S. 293, 295, 314 (1949) (condemning contracts that foreclosed about 7% of a market); Tampa Electric Co. v. Nashville Co., 365 U.S. 320, 329 (1961) (suggesting a rule of reason standard); HOVENKAMP, supra note 5, at 486 (“Nearly all lower courts today follow Tampa’s suggested rule of reason approach.”).

Jefferson Parish Hospital Dist. No. 2 v. Hyde, 466 U.S. 2, 7–8, 45–46 (1984) (O’Connor, J., concurring) (“When the sellers of services are numerous and mobile, and the number of
Foreclosure of 40% now appears to be required to trigger application of the rule.161

b. Refusals to Deal and Predatory Pricing

Section 2 of the Sherman Act162 has been interpreted to subject exclusionary conduct by dominant firms to rule of reason review.163 Courts have narrowed the application of the refusal to deal and predatory pricing categories of exclusionary conduct considerably in recent years, thereby converting to allowance some conduct once subject to a rule of reason.

Refusal to deal was once a broad category that swept in any refusal of a firm to do business with another that a court might consider a threat to competition.164 It was used to condemn everything from the refusal of a newspaper to run advertisements for firms that also chose to advertise with a competitor165 to an electric utility that refused to allow a competing utility to use its lines to supply power to consumers.166 A refusal to deal is now actionable only if it is a termination of a profitable business relationship.167

Similarly, predatory pricing was once a broad category that swept in any price reduction by a large firm that a court thought was intended to harm a competitor. In the 1970s, courts started to narrow the area of conduct subject to it by imposing a technically demanding requirement of below-cost pricing.
to trigger liability. The requirement was adopted by the Court in *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.* Almost no predatory pricing claim has prevailed since 1975, which suggests that the narrowing of the coverage area was substantial.

In the case of refusals to deal, the narrowing is a lower court initiative. These courts have interpreted the refusal of the Court in *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko* to condemn a refusal to deal because it lacked the attribute, present in an earlier case, of being a termination of a prior profitable course of dealing, to impose the requirement that all actionable refusals to deal have that attribute. The Court has so far failed to correct that inferential leap.

Courts narrowing both refusals to deal and predatory pricing have claimed to be concerned with reducing false positives. But unlike in other areas, they have also expressed a willingness to accept false negatives in exchange. Thus the Court in *Brooke Group* suggested that any harmful price cutting that it might have excluded from coverage of its rule is “beyond the practical ability of a judicial tribunal to control without courting intolerable risks of chilling legitimate price cutting.”

In one recent refusal to deal case,

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168 See HOVENKAMP, supra note 5, at 371, 388 (describing the move to the Areeda-Turner average variable cost test for below-cost pricing as motivated by “increased skepticism about the frequency of predatory pricing” and describing calculation of costs under the test as “not always as easy as first appear[s]”); GAVIL ET AL., supra note 20, at 660–61, 672 (describing concern about false positives as “very influential” in bringing about tougher evidentiary burdens for plaintiffs in predatory pricing cases and observing that “[d]etermining whether . . . prices are ‘below cost,’ however, has proven to be a challenging task”).


170 GAVIL ET AL., supra note 20, at 672 (Since 1986, “no plaintiff, including the Department of Justice, has succeeded in satisfying the two prong ‘below cost + recoupment’ standard.”); HOVENKAMP, supra note 5, at 371 & n.6 (stating that “since 1975 . . . , only a small number of plaintiffs have prevailed in predatory pricing actions” and listing two examples of successful claims since that time).

171 Popofsky & Martinez, supra note 166, at 2.


175 See *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 223 (1993) (“As a general rule, the exclusionary effect of prices above a relevant measure of cost either reflects the lower cost structure of the alleged predator, and so represents competition on the merits, or is beyond the practical ability of a judicial tribunal to control without courting intolerable risks of chilling legitimate price cutting.”); *Superior Prod. P’ship v. Gordon Auto Body Parts*, 784 F.3d 311, 326 (6th Cir. 2015); *Barry Wright Corp. v. ITT Grinnell Corp.*, 724 F.2d 227, 234 (1st Cir. 1983) (refusing to craft a predatory pricing rule that allows any false positives).

176 *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. at 223; see Hemphill,
the court recognized that its rule could lead to false negatives and expressed a preference for false negatives on the ground that they are likely to be smaller in cost than false positives. This amounts to an argument that the optimal point for the economy lies in the direction of laissez faire because it expresses an opinion regarding the relative value to be gained from increasing under-enforcement or over-enforcement and therefore an opinion about the relative sizes of bad and good conduct in the field of conduct scrutinized by antitrust as a whole.

VI. MODIFYING THE RULE OF REASON

So far, I have assumed an unbiased rule of reason. For example, if the share of possible under-enforcement harm caused by a rule of reason is 30%, I have assumed that the share of over-enforcement harm must also be 30%. I call a “biased” rule of reason one for which the shares of under- and over-enforcement harm inflicted by the rule are not equal. Under a biased rule, under-enforcement harm might be 40% and over-enforcement harm 20%. The biasing of a rule may preserve its level of accuracy in the sense that the sum of its contributions to over- and under-enforcement harm may remain constant, as in my example, for which the new harms sum (40% + 20% = 60%) to the old (30% + 30% = 60%).

Scholars have attacked rules of reason on the ground that they are so costly that plaintiffs always lose. This amounts to the argument that the current rule of reason is so biased in favor of under-enforcement that it creates no over-enforcement harm and realizes 100% of possible under-enforcement harm. It therefore has the same error cost as an allowance, but costs more to enforce. The great advantage of a rule of reason, at least in theory, is its accuracy. Here it is missing. This might suggest that rules of reason are incapable of delivering on their promise. But it could also suggest that they

supra note 50, at 26–27 & n. 86 (describing the Brooke Group rule as “explicitly lenient” on defendants and lacking “accuracy”).

Novell, Inc. v. Microsoft Corp., 731 F.3d 1064, 1076 (10th Cir. 2013) (“If the doctrine fails to capture every nuance, if it must err still to some slight degree, . . .”).

Id. (“. . . perhaps it is better that it should err on the side of firm independence—given its demonstrated value to the competitive process and consumer welfare—than on the other side where we face the risk of inducing collusion and inviting judicial central planning.”).

See Stucke, supra note 23, at 1460–66 (arguing that the rule of reason is very costly to enforce); Carrier, supra note 42 (showing that under a rule of reason the plaintiff almost always loses).

See, e.g., F.M. Scherer & David Ross, Industrial Market Structure and Economic Performance 336 (1990) (arguing against a rule of reason because of the “unsuitability of U.S. judicial processes for making balanced judgments on issues as technical and complex as the reasonableness of a price-fixing scheme”); McChesney, supra
are not being applied properly and a restructuring is in order.

Critics of the current rule have called for adding presumptions to it that would reflect the estimates regarding the shares of good and bad conduct encompassed by a given category of conduct. 181 It is hard to say what effect the critics expect these proposals to have on bias, accuracy, and enforcement cost. 182 If the goal is to turn the prevailing rule from an expensive substitute for an allowance into an expensive substitute for a ban, then the pretense of calling it a rule of reason must be dropped.

Suppose that, when biased fully toward over-enforcement harm, which is to say, when the share of possible over-enforcement harm that it inflicts is zero, a rule of reason inflicts less over-enforcement harm than a ban. That is, its over-enforcement error share is less than 100%. This means that this rule is like a ban in that it catches all bad conduct, but more accurate than a ban in that it does not condemn all good conduct as well.

If the conduct at issue is thought to contain more bad than good, then such a fully biased rule of reason will generate lower error costs than any other rule of reason that has the same enforcement cost and the same accuracy. When there is more bad than good, over-enforcement inflicts less harm than under-enforcement, so the more that a rule of reason can be biased toward over-enforcement, all else equal, the better. It follows that those who believe in more antitrust enforcement because they believe that conduct currently subject to rules of reason is mostly bad, ought to argue for a budget-neutral restructuring of the rule of reason to ensure that it never allows bad practices to escape scrutiny, even if that means that it condemns many good business

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181 See Stucke, supra note 23, at 1483–87; Herbert Hovenkamp, The Rule of Reason and the Scope of the Patent, 52 SAN DIEGO L. REV. 515, 549 (2015) (“Rather than placing antitrust analysis into three silos dominated [sic] ‘per se,’ ‘quick look,’ and ‘rule of reason,’ it is better to think of the problem as setting proof requirements that vary with the circumstances.”); AMERICAN ANTITRUST INSTITUTE, Restoring Monopolization and Exclusion as Core Competition Concerns, in TRANSITION REPORT TO THE 45TH PRESIDENT OF THE UNITED STATES 10 & n. 40 (2016) (“[D]ifferent tests may be appropriate for different categories of conduct, depending in part on the potential costs of false positives and false negatives associated with the type of conduct.”) (and sources cited therein).

182 Cf. Maurice E. Stucke, Should the Government Prosecute Monopolies?, 2009 U. ILL. L. REV. 530–31 (2009) (suggesting changes to the rule of reason in monopolization cases that would reduce both false positives and false negatives); Hemphill, supra note 50, at 26–27 (arguing that less-restrictive-alternatives requirements in rules of reason are “accurate”, in contrast to other rule of reason approaches, such as that employed in predatory pricing cases, which are not).
practices.

Finally, I note that it is the principal argument of this article that minimizing error costs may require not just the restructuring of rules of reason but also a reduction in their coverage area. This may need to be accompanied by an increase in rule of reason intensity\(^{183}\) or it might not.\(^{184}\) Advocacy not only of reform of the rule of reason, but also of its rolling back, may therefore be appropriate.\(^{185}\)

VII. CONCLUSION

The rhetoric of over-enforcement harm has been highly effective at convincing courts to abandon bans in favor of rules of reason. Although some advocates of greater enforcement in antitrust have argued that antitrust must take under-enforcement harm into account as well,\(^{186}\) virtually no commentator has sought to defend bans that incidentally condemn some good conduct, which I call strong per se rules, against this assault. Instead, antitrust advocates have acquiesced in the triumph of the rule of reason and sought only to tweak it to temper the extent to which it creates under-enforcement harm.\(^{187}\) I show that this is a mistake. Absent a massive increase in enforcement budgets, a strong per se rule is an essential component of error cost minimization for those who believe that possible under-enforcement harm is large. It is perhaps not a coincidence after all that the mid-century antitrust regime that has been torn down of late, based as it was upon a belief that anticompetitive conduct is pervasive, embraced strong per se rules.

VIII. APPENDIX

Here I develop my model more formally. My goal is to find the choice of bans, allowances, and rules of reason that minimizes total error costs and to determine the effect of switching from one rule to another. I first describe five sets of assumptions that serve as the foundation of my model. I defend each in the body of this article. Next, I consider two cases. In the first, rule of reason intensity is fixed at a level that makes it too expensive for the enforcer

\(^{183}\) See supra Part II.D.3.

\(^{184}\) See supra Part II.D.2.

\(^{185}\) This conclusion runs contrary to the tack taken by current critics of the Chicago School. Baker, supra note 45, at 512 & n. 109 (“Post-Chicago economic developments generally tend to point antitrust in a more interventionist direction, but without suggesting that the doctrinal changes of the 1970s and 1980s should be overturned in favor of a return to antitrust’s structural era.”).

\(^{186}\) See supra note 24.

\(^{187}\) See supra note 181 and accompanying text.
to apply a rule of reason to all conduct. I call this the “fixed intensity case.” I evaluate this case using a functional form for rule of reason error costs in which the rule of reason inflicts equal proportions of under- and over-enforcement harm. I call this the “unbiased model” because in it the rule of reason is not biased in favor of either type of harm. The unbiased model satisfies all of my assumptions, but it is more restrictive than they are in ways that I discuss below.

In the second case, I allow rule of reason intensity to vary and assume that it is possible to choose its optimal level. I call this the “varying intensity case.” In evaluating this case, I do not adopt any particular functional form for rule of reason error costs; thus my results are somewhat more general here than those for the first case. I show how my general model in this case applies to both my unbiased model and a model employed elsewhere in the literature.

A. Assumptions and Basic Setup of the Model

I consider the antitrust regulation of a universe of conduct that may be divided into good and bad. I sometimes call the destruction of good conduct “over-enforcement harm” and the realization of bad conduct “under-enforcement harm.” The total value to consumers of all good conduct is \( V_R \) (for conduct that may fall victim to “regulatory” harm) and that of avoiding all bad conduct is \( V_a \) (for “anticompetitive” conduct). The universe of conduct is partitioned into \( I \) mutually exclusive subsets, each associated with an antitrust rule indexed by \( i \) and corresponding to value \( V_i \leq V_R + V_a \) and share \( n_i = \frac{V_i}{V_R + V_a} \) of total value \( V_R + V_a \). \( \sum_i V_i = V_R + V_a \) and \( \sum_i n_i = 1 \). The rule for any particular subset can be either a ban, an allowance, or a rule of reason.

I am interested in minimizing total error costs subject to a budget constraint that I identify shortly. I divide total error costs into the total value of good conduct weighted by the share of that conduct which the prevailing rules destroy, which I label \( p_I \), plus the total value of bad conduct weighted by the share of that conduct which the prevailing rules realize, which I call, \( p_{II} \). Total error costs are therefore \( p_I V_R + p_{II} V_a \).

**Assumption 1:** The value covered by rule \( i \) is divided between good and bad conduct in fixed proportions equal to the overall shares of good and bad conduct in the universe of conduct. Thus \( V_i = n_i V_R + n_i V_a \); the share of value covered by the rule that is value from good conduct is \( \frac{n_i V_R}{n_i V_R + V_a} = \frac{V_R}{V_a + V_R} \); the share that is value from bad conduct is \( \frac{V_a}{V_a + V_R} \). This is the assumption, described in the body of this article, that the decisionmaker
knows nothing about the character of any subset of the conduct under consideration. □

Assumptions 2: The error costs associated with antitrust rules are these. If rule \( i \) is a ban, it wipes out all of the good conduct associated with the rule. It therefore eliminates value \( n_i V_R \). If rule \( i \) is an allowance, it allows all bad conduct associated with it, and therefore inflicts error cost \( n_i V_a \). If rule \( i \) is a rule of reason, then it may preclude some good conduct and allow some bad, or it may have an identical effect to that of a ban or an allowance. □

With Assumption 1 and Assumptions 2, I can now provide a more detailed characterization of total error costs. I have

\[
p_I = \Sigma_{bans} n_i + \Sigma_{RR} r_I'
\]

and

\[
p_{II} = \Sigma_{allowances} n_i + \Sigma_{RR} r_{II}'
\]

\(\Sigma_{bans}, \Sigma_{allowances}, \text{ and } \Sigma_{RR} \) mean summation over all \( i \) for which the rule is a ban, allowance, or rule of reason, respectively. \( r_I' \) and \( r_{II}' \) are the share of good or bad conduct, respectively, destroyed or realized by a rule of reason within its ambit. Total error costs are therefore

\[
(\Sigma_{bans} n_i + \Sigma_{RR} r_I') V_R + (\Sigma_{allowances} n_i + \Sigma_{RR} r_{II}') V_a
\]

Assumptions 3: For a given level of rule of reason intensity \( R \), the shares of good and bad conduct destroyed by a rule of reason within its ambit are constant, regardless the subset of conduct to which it is applied. Error costs of a rule of reason are declining in rule of reason intensity. Rule of reason intensity is uniform over all rules, so I put no subscript on \( R \). □

Let \( n_I = \Sigma_{bans} n_i \) and \( n_{II} = \Sigma_{allowances} n_i \). Because there are only three types of rules, \( \Sigma_{RR} n_i \) is therefore \( 1 - n_I - n_{II} \). Assumption 3 allows me to drop the subscripts from \( r_I' \) and \( r_{II}' \) and gives me

\[
\Sigma_{RR} r_I' = (1 - n_I - n_{II}) r_I'
\]

and

\[
\Sigma_{RR} r_{II}' = (1 - n_I - n_{II}) r_{II}'
\]

Total error costs become

\[
[(1 - n_I - n_{II}) r_I' + n_I] V_R + [(1 - n_I - n_{II}) r_{II}' + n_{II}] V_a
\]

in which the (bracketed) coefficient of \( V_a \) is again \( p_{II} \) and that of \( V_R \) is again \( p_I \).

Assumptions 4: The marginal enforcement cost of a rule is constant in the share of the total value of all conduct that is brought within the ambit of the rule. Allowances have no enforcement cost and the marginal cost of enforcing a ban is less than that of enforcing a rule of reason. The marginal enforcement cost of a rule of reason is increasing in rule of reason intensity, which means that the greater the care that goes into applying a rule of reason, the greater the cost of applying the rule. □

The general form of a budget constraint that meets the Assumption 4 requirement that marginal cost be constant in the coverage areas of rules is

\[
C = C_a n_I + C(R)(1 - n_I - n_{II}), \text{ where } C \text{ is the total enforcement budget,}
\]
$C_a$ is the constant marginal cost of a ban, and $C(R) > 0$ is the marginal cost of the rule of reason, which latter is a function of rule of reason intensity $R$. Also by Assumptions 4, $C'(R) > 0$.

B. The Unbiased Model

I adopt $\frac{n_i}{R_i} (V_R + V_a)$ as rule of reason error cost. For this particular form of rule of reason error cost, the proportions of total good or bad value within the rule’s coverage area that the rule precludes are equal. Thus the rule precludes $\frac{n_i V_R}{n_i V_R} = \frac{n_i V_a}{n_i V_a} = \frac{1}{R_i}$ of the value of good or bad conduct within its coverage area.

I constrain my rule of reason to be more accurate than per se rules by requiring that $R_i \geq 2$. The total of the shares of good and bad value destroyed by my rule of reason is $2 R_i$. Under my restriction on $R_i$, this total can never be greater than 1. The share of the value of good conduct destroyed by a ban is $\frac{n_i V_R}{n_i V_R} = 1$ and the same for the share of the value of bad conduct allowed by an allowance. Under my restriction on $R_i$, in share terms, a rule of reason results in error no greater than that afforded by either alternative rule.

I now use this choice of functional form to derive expressions for $p_I$ and $p_{II}$. From Assumptions 3, $R_i = R$ and $\sum_{RR} \frac{n_i}{R_i} = \frac{1-n_I-n_{II}}{R}$. So I have $p_I = \frac{1}{R} [n_I(R - 1) + 1 - n_{II}]$ and $p_{II} = \frac{1}{R} [n_{II}(R - 1) + 1 - n_I]$. It is also useful to solve this system for $n_I$ and $n_{II}$. I obtain $n_I = \frac{1}{R - 2} [p_I (R - 1) + p_{II} - 1]$ and $n_{II} = \frac{1}{R - 2} [p_{II} (R - 1) + p_I - 1]$.

The set of attainable combinations of $p_I$ and $p_{II}$ is limited. Each choice of rules involves a tradeoff. Switching from an allowance to a ban drives $p_{II}$ down but $p_I$ up. Switching from a ban to a rule of reason drives $p_I$ down but $p_{II}$ up. And so on. The lowest $p_{II}$ attainable for a given $p_I$ occurs when $n_{II}$, which contributes to $p_{II}$ at the high rate of $R - 1$, is zero. Setting $n_{II}$ to zero in the expression for $n_{II}$ above and solving for $p_I$, I obtain $p_{II} = \frac{1-p_I}{R-1}$, which gives the lower bound on $p_{II}$. Observing that the lowest $p_I$ obtainable comes when $n_I$ is zero, I obtain $p_I = \frac{1-p_{II}}{R-1}$ as my lower bound on $p_I$. Because $R \geq 2$, $p_I$ and $p_{II}$ cannot sum to more than 1. The line $p_I + p_{II} = 1$ therefore defines maximum values for $p_I$ and $p_{II}$, which occur when there is no rule of reason. Taken together with the lower bounds on $p_I$ and $p_{II}$, this defines a closed feasible set. It is the triangle dBb in Figure 1.

I turn to the budget constraint. To comply with Assumption 4, I choose


$C_R R$ for the marginal cost of a rule of reason, where $C_R$ is a positive constant. I also set $C_R R > C_a$, where $C_a$ is the marginal cost of enforcing a ban. The budget constraint is therefore $C = C_a n_I + C_R R (1 - n_I - n_{II})$.

C. Fixed Rule of Reason Intensity and Unaffordable Full Coverage

**Proposition 1:** When the enforcement budget is too small to permit application of a rule of reason to all conduct, either a regime in which there are no allowances is optimal or a regime in which there are no bans is optimal, except in a special case.

**Discussion:** I wish to choose $p_I$ and $p_{II}$ to minimize error costs $p_I V_R + p_{II} V_a$ over the feasible set, subject to the constraint that cost is fixed at some budget level $C$ that is too small to meet full rule of reason coverage cost $C_R R$. Implicitly differentiating error cost, I obtain $\frac{dp_I}{dp_{II}} = -\frac{V_a}{V_R}$. The budget-neutral rate of substitution of $p_I$ for $p_{II}$ may be determined by substituting the expressions for $p_I$ and $p_{II}$ derived above into the cost function and implicitly differentiating to obtain $\frac{dp_I}{dp_{II}} = -\frac{C_a - C_R R^2}{(R-1)C_a - C_R R^2}$. Because the rates of substitution of $p_I$ for $p_{II}$ in the objective function and the constraint are both constant, there is a “corner solution” unless the rates are equal. If they are equal all points on the budget constraint lying within the feasible set are optimal. If they are not equal, then the optimal point is the intersection of $p_{II} = \frac{1-p_I}{R-1}$ and the budget constraint when $\frac{1}{R-1} > \frac{V_a}{V_R} > \frac{C_a - C_R R^2}{(R-1)C_a - C_R R^2}$ and $p_I = 0$ and $p_{II} = 1$ when $\frac{V_a}{V_R} > \frac{1}{R-1}$. This is the case in which no bans is optimal. The optimal point will be the intersection of $p_I = \frac{1-p_{II}}{R-1}$ and the budget constraint when $R-1 < \frac{V_a}{V_R} < \frac{C_a - C_R R^2}{(R-1)C_a - C_R R^2}$ and $p_I = 1$ and $p_{II} = 0$ when $\frac{V_a}{V_R} < R-1$. This is the case in which no allowances is optimal. I note that, if $R$ is fixed, when $\frac{V_a}{V_R} > \frac{1}{R-1}$ or $\frac{V_a}{V_R} < R-1$ the optimal rule is independent of the size of the budget. □

**Proposition 2:** The relative rates of substitution of $p_{II}$ for $p_I$ for each possible rule change as well as for a constant-budget combination of rule changes, for a budget insufficient to cover the cost of a rule of reason for all conduct, which are reflected in the slopes of the lines in Figure 1 and noted in part in the ranking in Table 1, are: rule of reason to allowance > ban to allowance > ban to combination of rule of reason and allowance at constant cost (a “budget-neutral” move) > ban to rule of reason. In the absence of a budget constraint, whether changing a given rule $i$ without changing the
coverage area of the rule increases \( p_{II} \) (laissez faire) or \( p_I \) (liability) is as described in Table 1. The foregoing assumes a fixed rule of reason intensity \( R > 2 \).

Discussion: The slope of the lower bound on \( p_{II} \), which gives the rate of substitution of \( p_I \) for \( p_{II} \) for conversions of bans to rules of reason, is \( R - 1 \) in absolute value. Because rules of reason are more expensive than bans \( (C_R > C_a) \), \( C_a - C_R R^2 \) and \( (R - 1)C_a - C_R R^2 \) are both negative, so the absolute value of the slope of the budget constraint is \( \frac{C_a - C_R R^2}{(R - 1)C_a - C_R R^2} \). Indeed, \( \frac{C_a - C_R R^2}{(R - 1)C_a - C_R R^2} > 1 \) so long as \( R > 2 \), which is the case in which rules of reason are always more accurate than per se rules. Under it, \( \frac{C_a - C_R R^2}{(R - 1)C_a - C_R R^2} < R - 1 \).

Conversion of bans to allowances substitutes \( p_I \) for \( p_{II} \) at rate 1 because each inflicts 100% of its type of possible error cost. Thus for \( R > 2 \) the rate of substitution of \( p_I \) for \( p_{II} \) at constant budget is greater than that for conversions of bans to allowances (i.e., unity) but less than that associated with conversions of bans to rules of reason. The slope of the lower bound on \( p_I \), which gives the rate of substitution of \( p_I \) for \( p_{II} \) for conversions of rules of reason to allowances, is \( \frac{1}{R - 1} \) in absolute value and therefore always less than 1 for \( R > 2 \). All entries in Table 1 may be inferred by considering the slope for the relevant rule change. □

D. Varying Rule of Reason Intensity

So far I have treated rule of reason intensity \( R \) as fixed. I now consider the case in which \( R \) may vary to minimize error costs. I ask whether, in the presence of a budget constraint, a mix of bans and rules of reason ever reduces error costs relative to full rule of reason coverage and find that it does. I assume that the coverage of allowances is zero \( (n_{II} = 0) \) because I am interested only in ban error costs relative to those of a rule of reason. In other words, here I find conditions not for achieving the globally optimal mix of rules but only for achieving the optimal mix conditional on the absence of allowances. In this discussion, I do not specify the functional forms of rule of reason error and enforcement costs. This gives my results greater generality than those for the fixed intensity case. I later show that my results in this case hold for the unbiased model and that of another contributor to the literature. Assumptions 1 through 5 continue to apply.

Total error costs when an area of activity is divided between a rule of reason and a ban of size \( n_I \) are \([ (1 - n_I) r_I + n_I ] V_R + (1 - n_I) r_{II} V_a \), which simplifies to \( (1 - n_I)[r_{II} V_a + r_I V_R] + n_I V_R \). The budget constraint is \( C = C_A n_I + C(R)(1 - n_I) \). From the budget constraint, it is clear that the funds
available to purchase rule of reason intensity, \( C(R) (1 - n_I) \), are what remains after the cost of the ban is deducted from the budget, \( C - C_a n_I \). These funds purchase a level of intensity \( R \) that determines the size of the rule of reason error shares, \( r^I \) and \( r^{II} \). But for a fixed budget and marginal cost of a ban, the amount of these funds is entirely determined by the size of the ban, \( n_I \). It follows that \( V_a r^{II} + V_R r^I \) is a function of \( n_I \), operating indirectly through the determination of \( R \).

I define \( f(n_I) \equiv V_a r^{II} + V_R r^I \) and, in order to conform my notation with that of the other work that I discuss shortly, \( \rho \equiv V_R \). I therefore have for total error costs when an area of activity is divided between a rule of reason and a ban:

\[
(1 - n_I) f(n_I) + \rho n_I. \tag{1}
\]

\( f(n_I) \) is the error cost that prevails if there is no ban and a rule of reason is applied to all conduct. \( \rho \) is the total over-enforcement harm that is realized if all conduct is banned.

I now place the above discussion regarding the indirect relationship between \( f \) and \( n_I \) into more formal terms. \( f(n_I) \) is the composition of \( f(R) \), which is rule of reason error cost as a function of rule of reason intensity, and \( R = g(n_I, C) \), the budget constraint that gives rule of reason intensity \( R \) as a function of the coverage of a ban and a fixed enforcement budget \( C \). \( f(n_I) = f(g(n_I)) \). Thus the size of the ban determines the intensity of application of the rule of reason and therefore the size of the error costs that it is capable of inflicting at full coverage. For clarity, I refer to \( f(R) \) as \( f_R \) and \( f(n_I) \) as \( f \) from now on.

**Proposition 3:** The general condition for a ban to achieve lower error cost than a rule of reason is that (1) have a minimum in \( n_I \in (0,1] \). Sufficient conditions for this to hold are that \( f(0) > \rho \), or that both \( f(0) < \rho \) and \( f'(0) < -[\rho - f(0)] \).

**Discussion:** When \( f(0) > \rho \), a full ban \( (n_I = 1) \) has lower error costs than a full rule of reason. A partial ban \( (n_I \in (0,1)) \) may give rise to even lower error costs, depending on the nature of \( f(n_I) \). Regardless, it is clear that, when \( f(0) > \rho \), some level of ban reduces error costs relative to a rule of reason in this case.

When \( f(0) < \rho \), the question becomes whether \( f(0) \) is an error cost minimum relative to any level of ban (i.e., relative to any \( n_I > 0 \)). If \( f(0) \) is a minimum, then any level of ban cannot achieve lower error costs than a rule of reason. (1) is falling when \( f'(n_I) < -[\frac{\rho - f(n_I)}{1 - n_I}] \). If this holds at \( n_I = 0 \), which is to say, if \( f'(0) < -[\rho - f(0)] \), then there exists an \( n_I \in (0,1] \) for
which error cost is less than that at \( n_I = 0 \). Under this condition some non-zero coverage level of a ban reduces error costs. □

**Proposition 4:** \( f'(0) < 0 \).

**Discussion:** I have \( f'(n_I) = f'_R(R)g'(n_I) = f'_R(R) \frac{dR}{dn_I} \). Implicitly differentiating the budget constraint with respect to \( n_I \), I obtain \( \frac{dR}{dn_I} = - \frac{c_a - C(R)}{(1-n_I)C'(R)} \), which is positive when \( C(R) > C_a \). This establishes formally my observation above that an increase in the coverage of a ban converts the increased coverage area from higher cost rules of reason to lower cost bans, freeing up resources that can be used to purchase greater levels of intensity for the coverage areas still subject to a rule of reason. By Assumptions 2, the error cost of full rule of reason coverage as a function of rule of reason intensity, \( f_R(R) \), is falling in rule of reason intensity. So I have \( f'_R(R) < 0 \). Because I have that \( f'_R(R) < 0 \) and \( \frac{dR}{dn_I} > 0 \), \( f'_R(R) \frac{dR}{dn_I} < 0 \) and \( f(n_I) \) is therefore falling in \( n_I \). □

The lower error cost of a full ban in the case in which \( f(0) > \rho \) has been recognized elsewhere.\(^{188}\) I am interested in finding the conditions that create the less intuitive result that a partial ban is appropriate even though the enforcement budget is large enough to make a full rule of reason preferable to a full ban. The results for the case \( f(0) < \rho \) that follow have not been recognized elsewhere.

**Proposition 5:** A ban of at least some conduct is appropriate if (1) error cost reductions associated with small increases in rule of reason intensity are large or (2) if rules of reason are very expensive relative to bans.

**Discussion:** Whether \( f'(0) \) is sufficiently negative to satisfy \( f'(0) < -[(\rho - f(0)) \] depends on the magnitudes of \( f'_R(R) \) and \( \frac{dR}{dn_I} \). If \( f'_R(R) \) is very negative, which means that small changes in rule of reason intensity greatly reduce error costs, then \( f'(0) < -[(\rho - f(0)) \] and some amount of ban coverage is appropriate. If \( \frac{dR}{dn_I} \) is very positive, which means that small increases in ban coverage greatly increase the amount of rule of reason intensity that may be purchased, then \( f'(0) < -[(\rho - f(0)) \] and some

amount of ban coverage is appropriate. Because \( \frac{dR}{dn_I} = -\frac{C_a - C(R)}{(1-n_I)C'(R)} \), \( \frac{dR}{dn_I} \) is very positive if \( C_a \) is much smaller than \( C(R) \). □

I note that the case \( f(0) < \rho \) and \( f'(0) < -[\rho - f(0)] \) can include the case in which a rule of reason is “fully biased” in favor of over-enforcement harm and creates no under-enforcement harm. In such a case, if the rule of reason is more accurate than a ban, then it must inflict less over-enforcement harm than a ban. It might appear that it is therefore always to be preferred to a ban. Proposition 5 shows that this is not the case. It shows, for example, that if the marginal reduction in over-enforcement harm that may be purchased with the cost savings from adding bans is large, then it is optimal to divide coverage between bans and rules of reason.

**Proposition 6:** The case \( f(0) < \rho \) and \( f'(0) < -[\rho - f(0)] \) holds only if \( C \) is neither too small nor too large. If \( C \) is too small, then \( f(0) > \rho \), and, if it is too large, then \( f'(0) > -[\rho - f(0)] \) and, in this latter case, a ban cannot minimize error costs.

**Discussion:** I have \( \frac{df(n_I)}{dC} = f'_R(R) \frac{dR}{dC} \). From the general form of the budget constraint, I have \( \frac{dR}{dC} = \frac{1}{C'(R)(1-n_I)} > 0 \). For constant rule coverage, an increasing budget always allows more funding to be plowed into increasing rule of reason intensity. I show first that a small \( C \) may cause \( f(0) < \rho \) to fail. Because I have that \( f'_R(R) < 0 \) and \( \frac{dR}{dC} > 0 \), \( f(n_I) \) is falling in \( C \). This means that it may be the case that for sufficiently small \( C \), \( f(0) > \rho \). The idea here is that when the enforcement budget is very small, the budget may be insufficient to purchase enough rule of reason intensity to make a rule of reason achieve lower error costs than a full ban. I show next that a large \( C \) may cause \( f'(0) < -[\rho - f(0)] \) to fail. I observed above that \( f(n_I) \) is falling in \( C \). As a result, \( -[\rho - f(0)] \) becomes more negative as \( C \) increases, and may cause a violation of the condition \( f'(0) < -[\rho - f(0)] \). The idea here is that when the enforcement budget is very large, a high intensity may be purchased even when a full rule of reason is applied. As a result, the increase in error costs associated with reducing rule of reason coverage to make way for a marginal increase in ban coverage is large, and the reduction in error costs from purchasing additional intensity with the cost savings associated with the marginal increase in ban coverage must be high indeed in order to offset them. □

There will indeed be both a floor and a ceiling required for \( C \) in order for \( f(0) < \rho \) and \( f'(0) < -[\rho - f(0)] \) to hold in the case of the two functional forms of \( f(n_I) \) that I consider below.
1. As Applied to the Unbiased Model

I now apply the particular functional forms for rule of reason error costs and enforcement costs that makes up the unbiased model to the general model that I develop in this section. I have \( C(R) = C_R R \) and \( f(n_i) = \frac{(1-n_i)C_R}{C-C_a n_i} (V_R + V_a) \). The conditions \( f'(0) < -\rho \) and \( f''(0) < -[\rho - f(0)] \) are satisfied for \( \frac{C_R(V_R+V_a)}{V_R} < C < \frac{V_R+V_a}{V_R} \left[ C_R + \sqrt{C_R^2 - \frac{V_R}{V_R+V_a} C_R C_a} \right] \). Indeed, because \( f''(n_i) < 0 \) over \( n_i \in [0,1] \) for this functional form, I can find the \( n_i^* \) that globally minimizes error cost, which is \( n^* = \frac{C - \sqrt{C_R(C-C_a)^2}}{C_a} \), for \( P = \frac{V_R}{V_R+V_a} \). It is greater than zero. I note that \( n^* \) is always defined for \( P < \frac{1}{2} \) because \( C_R R > C_a \) and the minimum \( R \) is 2. However, \( C_R \) can be larger than its minimum, in which case \( n^* \) is defined for larger \( P \). Increases in \( P \) reduce the ceiling on \( C \) because as \( V_R \) gets large the error cost of a ban increases, requiring bigger gains from rule of reason intensity in order to be justified.

I note that in the unbiased model, \( f(0) > \rho \) implies that \( \frac{V_a}{V_R} > R - 1 \), which is the condition for a full ban to be optimal in that model.

2. As Applied to Kwak’s Model

I now apply the general model to the model of Kwak.\(^{189}\) It uses a deterrence model to determine how much over- and under-enforcement harm is caused by a rule of reason. Kwak considers total, instead of consumer, welfare, but the latter can be substituted for the former in the model without making any changes to its structure.

Kwak assumes that there are bad firms that profit from total-welfare-reducing anticompetitive behavior and good firms that profit from total-welfare-increasing procompetitive behavior. The relative effect of these two types of firms is determined by \( \rho \in [0,1] \), which gives the weight to be placed on the total benefit created by the good firms. \( x \) is the total welfare effect of a given firm; it is negative for reductions and positive for increases. Antitrust regulates by setting the level of \( x \) below which there is a violation of antitrust law, which level is called \( L \). A firm enjoys a share \( \alpha \) of its welfare effect \( x \) as profit; \( \alpha \) is the firm’s technology. The distribution of technology over firms of each type is uniform. Enforcers lack perfect information about the welfare effect of each firm; as a result, for enforcers a given effect \( x \) is

\(^{189}\) Kwak, supra note 1.
uniformly distributed over $[x - \sigma, x + \sigma]$, where $\sigma$ is the standard deviation. The cost of a rule of reason is $C = \frac{A}{\sigma}$. Thus, unlike in my model, here rule of reason intensity $R$ is captured by $\sigma$ and increases when $\sigma$ decreases. In this model a ban is free because it requires no information about the character of conduct. There is no cost of administering enforcement.

Kwak defines benefit and harm relative to a baseline in which there is neither the benefit conferred by good firms nor the harm created by bad firms. To conform the model to mine, I redefine Kwak’s harm and benefit in relation to a baseline in which there is the total possible benefit conferred by good firms and none of the possible harm conferred by bad firms.

Kwak assumes that all antitrust rules must be applied with full coverage. Thus there may either be a rule of reason with some intensity $\sigma$ that applies to all firms or a ban or allowance that applies to all firms. To model partial ban coverage, I assume that enforcers may impose a ban on a share $n_I$ of all firms that are randomly chosen from the set of all firms. The assumption that the firms are randomly chosen allows me to assume that the distribution of technologies $\alpha$ is the same in the group of banned firms as in the group of firms that are not banned. This permits me to use the expressions for benefit and cost derived by Kwak for all firms as a group in my analysis of the effect of a rule of reason when applied only to a share of those firms.

I also assume that application of a rule of reason to a share $1 - n_I$ of all firms reduces the cost of the rule of reason to $\frac{(1-n_I)A}{\sigma}$. Thus reducing the coverage of a rule of reason has a negative effect upon its cost, all else equal. This is plausible if one imagines that tailored information about each firm must be collected in order for enforcers to generate and act on an estimate of its welfare effect at a given $\sigma$.

Kwak allows enforcers to set the liability level $L$, which roughly corresponds to determining the level of bias in my model, as lower $L$ tends to preserve more good conduct but allow more bad conduct. For convenience, I fix $L$ at zero, which means that any conduct that reduces welfare violates antitrust law. From Kwak’s work, I have that at $L = 0$ all bad firms are deterred and there is only over-enforcement harm, which takes the weight $\rho$.

Specifically, I have $\rho \left[ 1 - \int_{\alpha(1-\sigma)}^{1} \frac{1}{4\sigma} \, d\alpha \right]$ for error cost associated with regulation of good firms, where the integral sums the benefit of size $x = 1$ conferred by each good firm over all firms with technology sufficiently large to turn a profit given liability level $L = 0$ and standard deviation in measurement of benefit $\sigma$.

In effect, the rule of reason here is fully biased in favor of over-enforcement harm. The question I seek to answer is when it is better to incur that harm in part through a ban rather than entirely through a rule of reason.
Solving the integral, I obtain \( \frac{\rho k (1-\sigma)^2}{4 \sigma} \) for \( f_R(R) \) in this model, where \( R \) is represented by \( \sigma \) and increases as \( \sigma \) falls. Unlike in my model, \( f_R(R) \) is not uniformly decreasing as \( \sigma \) falls, but instead reaches a minimum at \( \sigma = 1 \).\(^{190}\) Thus all error cost may be eliminated at this level.

With a constant budget \( C \), greater reductions in \( \sigma \) may be purchased as \( n_I \) increases and costly rule of reason areas are converted to free ban areas, so in this case instead of \( C(R) \) I have \( \sigma = \frac{(1-n_I)A}{c} = (1-n_I)E \), where I use \( E \) for \( A/C \) and \( \sigma \) is rule of reason intensity instead of \( R \). Using this expression for \( C(R) \), I obtain \( f(n_I) = \frac{\rho(k(1-(1-n_I)E)^2)}{4(1-n_I)E} \). \( \rho \) plays itself (i.e., the error cost of a full ban is \( \rho n_I \)) because in Kwak’s model total possible benefit, and therefore total possible over-enforcement harm, is 1, but benefit receives the weight \( \rho \), so total possible benefit is in fact \( \rho \). Plugging my expression for \( f(n_I) \) into (1), I have \( (1-n_I) \left[ \frac{\rho(k(1-(1-n_I)E)^2)}{4(1-n_I)E} \right] + \rho n_I \) for total error costs.

The conditions \( f(0) < \rho \) and \( f'(0) < -[\rho - f(0)] \) are satisfied for \( \frac{k+2}{k} < E < \frac{k+2}{k} + \frac{2}{k} \sqrt{1+k} \). This places corresponding upper and lower bounds on \( C \). From (1), with appropriate substitutions, I obtain an optimal level of ban of \( n_I^* = 1 - \frac{k+2}{Ek} \) or equivalently \( \sigma^* = \frac{k+2}{k} \). I note that \( \rho \) plays no role in this result because for liability \( L = 0 \) bad firms are deterred and the problem is minimizing only over-enforcement harm. Without under-enforcement harm, the relative sizes of the types of harm, which is captured by \( \rho \), is immaterial. The fact that a ban is justified in this flavor of Kwak’s model, in which a rule of reason creates no under-enforcement cost, shows that the potential for a ban to reduce error costs is not conditional on the existence of a tradeoff between types of error cost. Even a rule of reason that is completely biased toward over-enforcement cost may be inferior to a ban.

\(^{190}\) The fact that \( f_R(R) \) is not strictly falling in \( R \) is a violation of Assumption 3, which requires that error costs always decline in rule of reason intensity. However, my model holds just as well if Assumption 3 is modified to require only that rule of reason error cost be falling while \( R \) is low. \( f_R(R) \) is not strictly falling in \( R \) when high levels of rule of reason effort backfire and drive up error costs.
<table>
<thead>
<tr>
<th></th>
<th>Allowance</th>
<th>Ban</th>
<th>Rule of reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowance</td>
<td>No change</td>
<td>Liability Cost ↑ Net: Over-enforcement (weak)</td>
<td>Liability Cost ↑ Net: Under-enforcement (weak)</td>
</tr>
<tr>
<td>Rule of reason</td>
<td>Under-enforcement (1) Cost ↓ Net: Over-enforcement (weak)</td>
<td>Liability Cost ↓ Net: Over-enforcement</td>
<td>No change</td>
</tr>
</tbody>
</table>

Numbers in parentheses give the ranking of the rate at which the share of possible under-enforcement rises when the share of possible over-enforcement falls. One corresponds to the highest rate, or the flattest move to the northeast in Figure 1, and three to the smallest rate, or the steepest move.
<table>
<thead>
<tr>
<th>Category</th>
<th>Change</th>
<th>Case or means</th>
<th>In model terms</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tying</td>
<td>Increase in the market power requirement</td>
<td>Jefferson Parish</td>
<td>Ban→ allowance</td>
<td></td>
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<tr>
<td>Vertical non-price restraints</td>
<td>Overturning of per se rule</td>
<td>Sylvania</td>
<td>Ban→ rule of reason</td>
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<tr>
<td>Vertical price restraints</td>
<td>Overturning of per se rule</td>
<td>Leegin</td>
<td>Ban→ rule of reason</td>
<td></td>
</tr>
<tr>
<td>Mergers</td>
<td>Serious consideration of market shares, greater attention to efficiencies</td>
<td>General Dynamics as interpreted by the lower courts</td>
<td>Ban→ rule of reason</td>
<td></td>
</tr>
<tr>
<td>Mergers</td>
<td>Increase in the market share required for scrutiny</td>
<td>1982 merger guidelines and subsequent enforcement practice</td>
<td>Ban→ allowance</td>
<td></td>
</tr>
<tr>
<td>Reverse payment settlements</td>
<td>Imposition of rule of reason</td>
<td>Actavis</td>
<td>Allowance→ rule of reason</td>
<td></td>
</tr>
<tr>
<td>Exclusive dealing</td>
<td>Increase in the market power requirement</td>
<td>Jefferson Parish</td>
<td>Rule of reason→ allowance</td>
<td></td>
</tr>
<tr>
<td>Refusal to deal</td>
<td>Requirement that refusal to deal involve termination of a prior profitable course of dealing</td>
<td>Interpretation of Aspen Skiing and Trinko by the lower courts</td>
<td>Rule of reason→ allowance</td>
<td></td>
</tr>
<tr>
<td>Predatory pricing</td>
<td>Requirement that price be below a measure of cost</td>
<td>Brooke Group</td>
<td>Rule of reason→ allowance</td>
<td></td>
</tr>
</tbody>
</table>
The vertical axis gives the share of possible over-enforcement harm, $p_I$, and the horizontal axis gives the share of possible under-enforcement harm, $p_{II}$. Line ab gives the points attainable when no bans are used. It also gives the direction of change for conversions from rules of reason to allowances (moving to the right) and allowances to rules of reason (moving to the left). Line dc gives those attainable when no allowances are used. It also gives the direction of change for conversions from bans to rules of reason (moving to the right) and rules of reason to bans (moving to the left). Thus if the economy starts at point A and a ban is converted to a rule of reason, the economy would move to the northeast at a slope equal to the slope of line dc. Line db gives the points attainable when no rules of reason are employed, as well as the direction for changes between bans and allowances. The line containing A gives all attainable points for a given budget level. The grey lines represent...
points of equal error cost. Error cost falls as the lines move to the left. As possible under-enforcement harm increases, their slope increases. Here the slope is large enough to support a no allowances optimum. The lowest error cost attainable on the budget line (the line containing point A) is that at which it intersects line dc, which is the no allowances line. If there is no budget constraint, then exclusive use of rules of reason is possible, which puts the economy at point B. This minimizes error costs only if the slope of the error cost lines does not exceed the slope of the no allowances line. Otherwise, point d, which represents a ban of all conduct, is optimal.

When enforcement budgets are zero, the only attainable point is b, which represents allowance of all conduct. As budgets increase, the set of attainable points expands to include increasing potions of lines db and ab, as well as a budget-neutral line with the same slope as the line containing point A. Thus the set of attainable points forms first a triangle and then, after point d becomes attainable, it starts to include part of line dc. In the figure, the set of attainable points are all those falling on or within the trapezoid formed by line db, the line containing point A, and the sections of dc and ab connecting the two. The regions bounded by lines dc, ab, and the exes are not attainable at any budget level. But increases in rule of reason intensity reduce the error costs of rules of reason, bringing lines dc and ab closer to the \( p_l \) and \( p_{II} \) axes respectively and increasing the set of points attainable for sufficiently high budgets.
The value for each year represents the budget that would be required to purchase an equivalent amount of enforcement in 2009 given the change in the size of the economy, taking into account changes in federal government productivity due to progress in information technology.