CHAPTER 3
DECISION THEORY APPROACH

List of Figures

List of Tables

Decision theory is a rational methodology for making well-reasoned, "optimal" decisions with imperfect information.[1] It takes account of the cost and reliability of information that might be gathered before a decision is made and the possible sequencing of the information gathering.

[1] Economists use the term *optimal* to denote a decision or policy that does the best job of balancing two or more conflicting objectives or constraints. For example, economists might define the optimal price as the price that maximizes a firm's profits by balancing the demand characteristics and costs. Or it might refer to a person's decision to work an extra two hours a day in order to buy better health insurance as the person's optimal balancing of leisure versus health benefits.

Decision theory is highly relevant for antitrust law, which must strike a balance between the potential for procompetitive and anticompetitive effects of conduct in adjudicating specific cases and setting legal standards for liability for various categories of conduct. Appellate courts must set these standards based on the knowledge that (i) there will be heterogeneity across cases and (ii) trial courts make decisions on the basis of limited, imperfect evidence presented by parties that have incentives to provide only evidence favorable to their side. The litigants' financial stakes in the case also may differ substantially. For example, the defendant hopes to preserve its monopoly profits by excluding a rival. By contrast, the plaintiff hopes to earn its share of competitive profits. Given these constraints, no set of rules will be perfect; the goal is to minimize the cost of errors in both trial outcomes and imperfect deterrence effects.

The various legal standards applied in antitrust law—the rule of reason, per se illegality, quick look, evidence necessary to establish an agreement, the structural presumption and sliding scale in merger analysis, and per se legality for certain conduct—can be interpreted and better understood in light of decision-theory analysis. Decision theory has been explicitly used to propose antitrust legal standards.[2] It focuses on setting legal standards and making adjudicative decisions that minimize the expected welfare losses of inaccurate decisions, thereby maximizing expected welfare.[3] Decision-theory analysis recognizes that courts make decisions based on imperfect and costly information and that legal standards affect deterrence.

Decision theory can also play a normative role. It can be used to set legal standards by balancing the

---

[2] See, e.g., Richard A. Posner, *An Economic Approach to Legal Procedure and Judicial Administration*. 2 J. LEGAL STUD. 399 (1973); Paul L. Joskow & Alvin K. Klevorick, *A Framework for Analyzing Predatory Pricing*, 89 YALE L.J. 213 (1979); Richard A. Posner, *An Economic Approach to the Law of Evidence*, 51 STAN. L. REV. 1477, 1484 (1999); C. Frederick Beckner III & Steven C. *Salop, Decision Theory and Antitrust Rules*, 67 ANTITRUST L.J. 41 (1999); Louis Kaplow, *Optimal Proof Burdens, Deterrence, and the Chilling of Desirable Behavior*, 101 AM. ECON. REV. PAPERS & PROCEEDINGS 277 (2011); Mark S. Popofsky, *Defining Exclusionary Conduct: Section 2, The Rule Of Reason, and the Unifying Principle Underlying Antitrust Rules*, 73 ANTITRUST L. J. 435 (2006); Louis Kaplow, *Burden of Proof*, 121 YALE L.J. 738 (2012); Ronald J. Allen & Alex Stein, *Evidence, Probability, and the Burden of Proof*, 55 Ariz. L.R. 557, 580, 593 (2013). Andrew I. Gavil & Steven C. Salop, *Probability, Presumptions and Evidentiary Burdens in Antitrust Analysis: Revitalizing the Rule of Reason for Exclusionary Conduct*, 168 U. PA. L. REV 2107, 2139-42 (2020).

[3] Economics defines several types of economic welfare that are affected by the market restraints on competition. *Total welfare* can be defined informally as the total benefit, or "happiness," generated from the market outcome. In more formal terms, *total welfare* is the sum of the economic welfare of all participants, including direct purchasers; firms alleged to be engaged in anticompetitive conduct; their rivals, who may be positively or negatively affected by that conduct; and suppliers (including workers) that may be affected. In technical economic jargon, these welfare terms are associated with the economic concepts of consumer surplus and producer surplus. In most antitrust analysis, these welfare effects are applied only to participants directly affected. Economists refer to this approach of limiting the analysis of effects only to directly affected firms, purchasers, and suppliers as *partial equilibrium*. By contrast, *general equilibrium* involves the effects on all interconnected markets; it takes account of all feedback effects across the entire economy. Economics and antitrust law also use the concept of *consumer welfare,* which includes only the effects on directly affected purchasers (the term *consumers* includes direct purchasers firms and individuals). The concept of consumer welfare has also been generalized to the concept of *counterparty welfare*, which is applied to restraints that may directly harm workers or other input suppliers as well as purchasers. In this sense, the *consumer welfare standard* in antitrust can be seen more generally as a *counterparty welfare standard*. A potential confusion is that Robert Bork incorrectly used the term *consumer welfare* to refer to *total welfare*. See Robert Bork, THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF 107-110 (1978).

expected costs of erroneous convictions and over-deterrence (false positives) against the expected costs of erroneous acquittals and under-deterrence (false negatives). Suppose, for example, that each erroneous conviction leads to a cost of $10 whereas each erroneous acquittal leads to a cost of only $1. Given these costs, expected costs would be minimized by a standard that makes 9 false acquittal errors out of 10 cases that cost $1 each and 1 false conviction error that costs $10. This calculation implies that the "optimal" legal standard would find liability only if the court were at least 90.9 percent certain that the defendant was actually guilty.[4]

Legal decisions and standards reflect antitrust statutes. However, application of decision theory can elucidate the bases of current legal standards and possibly help improve them. To see why, consider the adoption of the rule of reason rather than per se illegality for certain horizontal and vertical price agreements.[5] Decision-theory analysis suggests that the more detailed analysis applied in the rule of reason can lead to welfare benefits by condemning fewer cases in which the conduct is actually procompetitive or neutral and reducing over-deterrence without disproportionately increasing the number and welfare cost of cases of increased anticompetitive conduct. Decision theory can improve courts' antitrust analysis and legal standards in numerous other ways as well, such as questioning a rule of per se legality for product changes by high-tech firms that impede interoperability.

Courts have long used economics to help interpret facts. Decision theory goes deeper, playing an important role in interpreting and continuing the evolution of the rule of reason.[6] Antitrust law and industrial organization economics can be characterized as an interactive double helix that is intertwined and held together by decision theory to the formulation of legal standards. Once economic and politics ideology are added to the mix, the better characterization is a triple helix.

I. Achieving Appropriate Deterrence and Avoiding Adjudicative Errors

Decision theory is a rational methodology for making optimal decisions in the face of imperfect information.[7] Its application to antitrust law takes account of the probability and magnitude of the error costs from incorrect decisions, the cost and reliability of information (evidence) that might be

---

[4] Readers may recognize this formulation of the tradeoff as the commonly stated Blackstone's ratio, which is used as a rationale for the "beyond a reasonable doubt" standard in criminal law. See Alexander Volokh, *N Guilty Men*, 146 U. PENN. L.R. 173 (1997)

[5] The rule of reason legal standard requires the plaintiff to provide evidence of actual or likely anticompetitive effects, as discussed later in this chapter and in Chapter 3. By contrast, the per se illegal legal standard does not require the plaintiff to document these effects evidence; it requires only that evidence be provided that is then used to trigger the per se standard.

[6] See, e.g., Frank H. Easterbrook, *Limits of Antitrust*, 63 TEXAS L.R. 1 (1984); Andrew I. Gavil, *Moving Beyond Caricature and Characterization: The Modern Rule of Reason in Practice*, 85 S. CAL. L. REV. 733 (2012); Andrew I. Gavil & Steven C. Salop *Probability, Presumptions and Evidentiary Burdens in Antitrust Analysis: Revitalizing the Rule of Reason for Exclusionary Conduct*, 168 U. PA. L. REV. 2107 (2020).

[7] For detailed analysis of the approach taken here, see Louis Kaplow, *Burden of Proof*, 121 YALE L.J. 738 (2012); See *also* John Kaplan, *Decision Theory, and the Factfinding Process*, 20 STAN. L. REV. 1065 (1968); Ronald J. Allen & Alex Stein, *Evidence, Probability, and the Burden of Proof*, 55 ARIZ. L. REV. 557, (2013). Originator credit is normally given to Leonard Savage, THE FOUNDATIONS OF STATISTICS (1954). See also Howard Raiffa, DECISION ANALYSIS: INTRODUCTORY LECTURES ON CHOICES UNDER UNCERTAINTY 27–33 (1968); Ken Binmore, RATIONAL DECISIONS (2009).

gathered before making a decision, and the optimal sequencing of information gathering. Antitrust law sometimes uses decision-theory language in its references to the importance of avoiding false positive and false negative error costs.

These error costs fall into two categories. One is adjudicative errors by trial courts that imperfectly apply particular legal standards to the facts. Legal standards should take account of the ability of courts to reliably interpret the limited facts and properly apply the relevant economic analysis as well as the ability and incentives of the litigants to provide evidence. Even with perfect judges, adjudicative errors are inevitable, because the evidence on which a decision is made is inevitably imperfect. The use of presumptions, evidentiary rules, and the choice of legal standards may reduce the cost of adjudicative errors. The use of irrebuttable presumptions that avoid the need for certain testimony can reduce trial time.

The second category of error is deterrence errors. Whereas adjudicative errors involve interpreting facts at trial, deterrence errors involve legal decisions and legal standards that affect future conduct in undesirable ways. Deterrence errors involve failing to deter anticompetitive conduct (under-deterrence), deterring procompetitive conduct (over-deterrence), or both. At the most general level, under-deterrence is like a false negative error and over-deterrence like a false positive error. Because deterrence effects may involve unobserved behavior, gauging them can be difficult. In addition, adjudicative errors can have counterintuitive effects on deterrence. For these reasons, claims about deterrence may be based on ideology rather than rigorous analysis of experience.

Weak enforcement from lack of detection also leads to under-deterrence. One would expect false negative adjudicative errors to reduce deterrence. But there can be an interesting and counterintuitive interaction between adjudicative errors and deterrence; false positive adjudicative errors will lead to under-deterrence if they diminish the incentives to comply with the legal standard by reducing the incremental benefits of compliance relative to noncompliance.[8]

Another complication is that a legal standard that reduces adjudicative errors may increase deterrence errors. For example, rules of per se illegality may prevent a district court from erroneous adjudicative false acquittals but also inevitably lead to some false convictions.

Per se illegality may also be suboptimal, however, because it could over-deter procompetitive conduct. Although saving time and effort, "conclusive presumptions" of illegality also create

[8] Richard A. Posner, *An Economic Approach to Legal Procedure and Judicial Administration*. 2 J. LEGAL STUD. 399 (1973). If, for example, the fine for violating a rule is $100 and there is perfect enforcement, a potential defendant would violate the rule only if the benefits exceeded $100. Suppose instead that there is a 20 percent likelihood that a defendant is erroneously found in violation of the rule and fined $100. In this case, the defendant would choose to violate the rule if the benefits from doing so exceeded $80. The expected fine from complying would now be $20 versus $100 from not complying, a difference of only $80. For a simple technical example, see Henrik Lando, *Does Wrongful Conviction Lower Deterrence?* 35 J. LEGAL STUD. 327, 329–30 (2006). If the error rates depend on the defendant's behavior, the relationship is more complicated. If, for example, a marginal increase in the defendant's legal (but barely so) exclusionary conduct substantially increases the rate of false positives, overdeterrence may occur. See Richard Craswell and John E Calfee, *Deterrence and Uncertain Legal Standards*, 2 J. LAW ECON. ORG. 279 (1986).

impediments to updating the standards, because they may prevent courts from learning. If all procompetitive uses of the conduct are deterred, courts will not learn that some conduct in the category can lead to benefits.

Analogous concerns arise from per se legality. For these reasons, it is not clear why per se legality is superior to the use of a procompetitive rebuttable presumption with a substantial rebuttal burden. A similar analysis applies to the choice between basing decisions on a very detailed rule of reason economic analysis of each participants' market power and the likely competitive effects of the conduct versus a more abbreviated "quick-look" analysis based on limited (and often categorical) information.

Setting optimal antitrust standards also involves weighing the costs and delays involved in the discovery and trial process against the benefits of having more evidence. Information is necessarily imperfect, because it is costly to develop. Decision theory can help judges determine how much information it makes sense to obtain and develop before making a decision, as described in detail below. It may be rational for the appellate court to limit the amount of information deemed relevant to the decision, as collecting and presenting additional information is not costless and may have diminishing returns and only marginal, if any, benefits.[9] In matters involving multiple issues (such as anticompetitive harms and procompetitive benefits), decision theory may be useful in deciding whether to analyze the issues simultaneously or sequentially and under what circumstances analysis of one of the issues should be abbreviated or forgone and replaced by a conclusive presumption.

In antitrust, demanding more evidence can even lead to more errors or lighter deterrence. Certain evidence may not be reasonably available or be unreliable because it too often signals an erroneous conclusion or is too likely subject to confusion, misinterpretation, or bias by the trial court or jury.[10] Moreover, requiring additional evidence disadvantages the plaintiff, who has both the initial and the ultimate burden of proof. Too high a burden on the plaintiff can also deter meritorious cases, leading to underdeterrence.

A. Analysis of Error Cost

The optimal legal standard will determine the relative rate of false positive and false negative decisional errors that minimize expected welfare losses. Those losses will depend on the welfare cost of each type of error (i.e., lost benefits versus harms borne). Several examples illustrate the point.

Consider first the case in which the costs of both kinds of error are equal. In this case, the optimal legal standard of proof placed on the plaintiff is to establish that the conduct is more likely than not (i.e., has a probability of more than 50 percent) harmful. In *In re Winship*, the Court explained:

---

[9] The collection of evidence should be "proportional to the needs of the case," including "whether the burden or expense of the proposed discovery outweighs its likely benefit." Fed. R. Civ. P. 26(b)(1).

[10] See Fed. R. Evid. 403 ("The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence"). See also Fed. R. Evid. 702(c) (expert opinion testimony can be excluded if it is not "the product of reliable principles and methods").

> In a civil suit between two private parties for money damages, for example, we view it as no more serious in general for there to be an erroneous verdict in the defendant's favor than for there to be an erroneous verdict in the plaintiff's favor. A preponderance of the evidence standard therefore seems peculiarly appropriate.[11]

Suppose that the defendant's conduct will be either procompetitive and raise welfare by $100 or anticompetitive and lower welfare by $100. If the court erroneously prohibits conduct that would raise welfare or erroneously permits conduct that would lower it, the cost of error is $100. Suppose that the court correctly concludes that the likelihood that the conduct is anticompetitive is 40 percent. The expected value of welfare from permitting the conduct can be calculated as $10 ([0.6 * $100] + [0.4 * -$100]). Thus, the conduct should be permitted. It should be prohibited only if the probability that it is anticompetitive is more than 50 percent.

This reasoning can also be applied to conduct with asymmetric error costs. Suppose that the welfare harm from erroneously prohibiting the defendant's conduct because it is actually procompetitive is $150 and that the analogous welfare harm from erroneously permitting the defendant's conduct because it is actually anticompetitive is $100. If the court correctly concludes that the likelihood that the conduct is anticompetitive is 50 percent, the expected cost of a false conviction (false positive in statistical terms) is $75 (0.5 x $150), whereas the expected cost of a false acquittal (false negative) is $50 (0.5 x $100). Because the cost of an erroneous conviction is higher, the conduct should be permitted, in order to minimize expected error costs. Only if the court concludes that the probability that the conduct is anticompetitive is more than 60 percent should it be prohibited, as at 60 percent probability, the expected cost of an erroneous acquittal is $60 (0.6 x $100), the same as the expected cost of an erroneous conviction (0.4 x $150). If the probability of harm exceeds 60 percent, the expected cost of an erroneous acquittal (false negative) is higher, so the conduct should be prohibited.

Suppose the welfare effects and associated error costs are reversed: The defendant's conduct will either be procompetitive and raise welfare by $100 or will be anticompetitive and lower welfare by $150. In this example, the cost of an erroneous conviction is $100 and the cost of an erroneous acquittal is $150. This asymmetry suggests a more plaintiff-friendly evidentiary standard. If the court correctly concludes that the likelihood that the conduct is procompetitive is 50 percent, the expected value of welfare of permitting the conduct is –$25 ([0.5 * $100] + [0.5 * -$150]). Thus, the conduct should be prohibited. It should be prohibited if the probability that it is anticompetitive exceeds 40 percent ([0.6 * $100] + [0.4 * -150)] = 0).

A legal standard that requires the plaintiff to prove that conduct is more likely than not anticompetitive leads to excessive false negatives, because it erroneously permits behavior that has a 40–50 percent probability of being anticompetitive. This skew can be corrected by changing the legal standard so that the plaintiff's burden of proof must only exceed 40 percent. It can be accomplished by explicitly changing the decision standard to something like "appreciable danger of harm." Alternatively, the burden placed on the plaintiff could remain at the "more likely than not"

[11] *In re Winship*, 397 U.S. 358 (1970).

probability standard, but the evidentiary standard for establishing each element (such as the elements necessary to establish an agreement or the market share required to establish monopoly power) might be altered.

Another possibility would be to adopt and apply an anticompetitive presumption to the conduct and then place a demanding rebuttal burden on the defendant. That is, instead of requiring the plaintiff to show anticompetitive effects with a likelihood greater than 40 percent, the court might presume the harm and then require the defendant to rebut that presumption with a probability of at least 60 percent. In probability terms, the two options are the same, but if the standards are set with qualitative descriptions, they may look different.

B. An "Enquiry Meet for the Case"

These examples are framed in the context of adjudicative errors for a single case. Decision-theory analysis can be generalized for the issue of setting a legal standard for a category of conduct, such as deciding a case on the basis of a presumption versus a full rule of reason analysis or mandating a rebuttable presumption and placing the rebuttal burden on the other party. In this context, the term *false positive* refers to over-deterrence of beneficial conduct in this category as well as adjudicative errors (false convictions)—that is, deterring too much beneficial conduct relative to harmful conduct. This approach can be termed an *enquiry meet for the case*, although this use of the term may not be exactly the way the Court used it in *California Dental.*[12]

The enquiry involves the evidentiary standard governing what facts need to be established by each side and how much evidence is needed. This standard can be applied to each step of the sequential multi-step rule of reason analysis. In this framework, the plaintiff bears the initial burden of providing sufficient evidence of anticompetitive harm (absent any procompetitive benefits) (Step 1). If the plaintiff can meet that threshold, the defendant has a rebuttal burden to provide sufficient evidence of plausible procompetitive benefits (Step 2). If it does, the plaintiff has the burden of showing overall anticompetitive effects or a less restrictive alternative (Step 3). The question of how much evidence is required by the parties at each step remains contentious, as does the question of the type of less restrictive alternatives that are considered cognizable.

Antitrust law also sometimes applies an abbreviated legal standard of per se illegality or shifts the burden to create the legal standard of quick-look condemnation to some conduct. These abbreviated standards do not require the plaintiff to provide initial evidence of anticompetitive effects. Instead, the likely effect is inferred on the basis of the type of conduct. A court similarly may apply per se legality and quick-look exonerations to other conduct. These standards are set out in more detail below.

[12] *California Dental Association v. F.T.C.*, 526 U.S. 756, 758 (1999). One might treat the reference to a "quick look" as relying on an irrebuttable presumption and a "more sedulous" analysis as applying the rule of reason. But Justice Souter's characterization of categorical decisions as "quicker" versus "more sedulous" can refer to a rebuttable presumption—that is, providing more or less evidence rather than spending more or less time deciding.

Different presumptions may be based on the likely differential costs of false positive and false negative errors for various types of conduct. A particular category of conduct may be presumed to be anticompetitive, procompetitive, or neutral. These presumptions may either be rebuttable or conclusive. Examples of "conclusive" (irrebuttable) presumptions include the per se illegality of naked price fixing and the per se legality of certain "privileged" conduct. The rebuttable presumption may be strong or weak, which can affect the allocation of burdens of production and proof between the parties and the height of those evidentiary burdens. The evidentiary standards can be tilted in favor of the plaintiff or defendant by altering the facts that must be shown or by lowering or raising the probability standard relative to more likely than not.[13]

California Dental's terminology of a sliding-scale "enquiry meet for the case" analysis of horizontal restraints is useful. However, the Court's language created some confusion by describing the required analysis in term of the time spent on the analysis rather than the burden of proof. Although not using the language of quick look, *BMI*[14] explained that the per se rule is applied only after various justifications are rejected on the basis of summary analysis of plausibility or likelihood.[15]

C. The Role of Presumptions

Presumptions based on information and experience regarding the competitive effects of a category of conduct can reduce the rate and cost of adjudicative errors as well as the cost of adjudication.[16] Presumptions can be used to improve the accuracy of decisions. They do so by adding information about the theory and overall historical experience with the category of conduct to supplement or even substitute for the necessarily imperfect case-specific evidence developed and presented at trial. Properly defined presumptions can also improve deterrence.

A technical Bayesian analysis of the optimal interaction between presumptions and optimal legal standards is provided at the end of this chapter. The basic idea is simple. Because case-specific evidence is invariably limited and imperfect, a decision maker should also take account of prior learning from theory on and experience with the category of conduct at issue in setting the evidentiary standards. The prior learning can be treated as a presumption (rebuttable or conclusive) applied to the category of conduct.

If the decision maker has strong views based on experience and other learning that a particular category of conduct is generally beneficial (i.e., a procompetitive presumption), it should take more and better case-specific evidence by the plaintiff to convince him or her that the conduct is more

---

[13] Louis Kaplow, *Burden of Proof*, 121 YALE L.J. 738, 758–62 (2012); Ronald J. Allen & Alex Stein, *Evidence, Probability, and the Burden of Proof*, 55 ARIZ. L REV. 557, 580, 593 (2013).

[14] *Broadcast Music, Inc. v. Columbia Broadcasting System, Inc.*, 441 U.S. 1 (1979).

[15] See Thomas G. Krattenmaker, *Per Se Violations in Antitrust Law: Confusing Offenses with Defenses*, 77 GEO. L.J. 165 (1989).

[16] Presumptions can also be used to place the burden of production on the party that has better access to the probative information. For example, one reason to place the burden of showing efficiency benefits from a merger on the defendant is that it would have the relevant information. Making the plaintiff disprove any efficiency benefits would force it to consider every conceivable possibility and then gather evidence that is mostly in the hands of the defendant.

likely than not harmful. A stronger procompetitive presumption should require more evidence by the plaintiff to establish harm. Similarly, if the decision maker has strong views based on experience and other learning that a particular category of conduct is generally harmful (i.e., an anticompetitive presumption), it should take more and better case-specific contrary evidence by the defendant to convince the decision maker that the conduct is more likely than not beneficial. A stronger anticompetitive presumption should lead to a higher rebuttal burden on the defendant to rebut the presumption.

Setting these differential standards is the job of appellate courts. Consistent with decision-theory analysis, various legal standards have been applied to categories of conduct. The Supreme Court sometimes but not always makes its decision-theory interpretation explicit, as will be discussed. Making these interpretations is a major theme of the analysis here. Doing so can help clarify the legal standards and suggest how they might be adjusted.

The focus of the analysis so far has been on the inferred competitive impact of narrow categories of conduct based on experience and narrowly focused industrial organization economic analysis of the category. However, some legal rules and presumptions are based on the antitrust statutes themselves. This framework applies to the *Philadelphia National Bank*[17] "structural presumption" in mergers under Section 7 of the Clayton Act, which interpreted the "may be" language of Section 7 of the Clayton Act as suggesting a lower burden on the plaintiff and then applied that lower burden by creating an anticompetitive presumption and a high rebuttal burden. *Baker Hughes*[18] applied a sliding scale that reduced the strength of the presumption and thereby the rebuttal burden for mergers involving markets with lower concentration and firms with smaller market shares.

Still other legal rules and presumptions are based on overarching considerations about market forces and the role of antitrust, not inferences based on historical experience. For example, *National Society of Professional Engineers*[19] observed that the Sherman Act is premised on the assumption that competition leads to the best market outcome and that this assumption "precludes inquiry into the question whether competition is good or bad."[20] This assumption is not based on inferences from a detailed analysis of experience with a variety of such claims over time. It is a postulate about the costs and benefits of particular institutional arrangements, not an inference from past experience or a confident prediction about effects in a particular case. Putting it in the language of presumptions, this assumption amounts to a broad "super-presumption" that permitting this inquiry would lead to numerous and broad claims of anticompetitive conduct parading under the claim that competition would be expensive, enforcement would be wasteful, and that the judicial costs of detecting, attacking, and assessing claims of anticompetitive behavior —and adjudicative error in doing so—would lead to excessive underdeterrence.

---

[17] *United States v. Philadelphia Nat. Bank*, 374 U.S. 321 (1963).

[18] *United States v. Baker Hughes Inc.*, 908 F.2d 981 (D.C. Cir. 1990).

[19] *National Society of Professional Engineers v. United States*, 435 U.S. 679 (1978).

[20] *Id.* at 695.

This super-assumption is applied to condemn joint pricing by several firms that obviously lack any market power and have a clear political motivation for the joint pricing. As an extreme and provocative example, suppose that two small bakeries in a city agree and advertise that they will refuse to supply cakes for gay weddings or will levy a $50 surcharge for doing so. Or suppose that two restaurants that want to support immigrants agree to offer $10 off to Spanish-speaking green card holders. These restraints are highly unlikely to materially harm competition or consumer economic welfare in the market, yet they would be subject to criminal liability under the per se rule on the basis of administrative convenience and the super-presumption supporting market outcomes, not the trivial risk to consumer welfare.[21]

A number of other super-presumptions run through antitrust jurisprudence. *Colgate* privileged certain refusals to deal based on a super-presumption that unilateral conduct would not be anticompetitive absent "any intent to create or maintain a monopoly."[22] *Trinko*[23] extended this privilege to firms with monopoly power, based on a super-presumption that such freedom is necessary to attract investment and innovation and an inference about over-deterrence based on the limited competence of the district court in setting prices.

As market conditions and economic learning can change over time, courts should be open to updating legal standards. Accurately learning from experience is not a simple process, however, because the cases that reach the court depend on the legal rule.[24] Indeed, the conduct observed by economists in the overall market also depends on the legal rule.[25] For example, a conclusive anticompetitive presumption will deter procompetitive as well as anticompetitive conduct. The most difficult cases close to the line will tend to be the ones that reach court, as easy cases will settle. The most egregious anticompetitive conduct will be deterred, and the most procompetitive conduct will not.

This learning process is also complicated by the role of ideology and prior views on the interpretation of evidence. When evaluating mixed evidence, there is a tendency for even educated decision makers to underweight evidence that is contrary to their prior belief and overweight evidence that supports that belief. Judges, legislators, and economists can all be affected by this "confirmation bias."[26]

Another complexity is that the evidence at trial depends on the parties' differing incentives to win the case. When the plaintiff is a rival firm attacking the defendant firm's anticompetitive conduct, its payoff in the event of victory is lower than its opponent's. In the typical case, the monopolist is

---

[21] *FTC v. Superior Ct. TLA*, 493 U.S. 411, 434 (1990).

[22] *United States v. Colgate & Co.*, 250 U.S. 300, 307 (1919).

[23] *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko*, LLP, 540 U.S. 398, 407 (2004).

[24] George Priest and Benjamin Klein, *The Selection of Disputes for Litigation*, 13 J. LEGAL STUD. 1 (1984).

[25] Bruce L. Hay, & Kathryn E. Spier, *Burdens of Proof in Civil Litigation: An Economic Perspective*, 26 J. LEG. STUD. 413 (1997).

[26] Richard A. Posner, HOW JUDGES THINK 111 (2008). See also Raymond S. Nickerson, *Confirmation Bias: A Ubiquitous Phenomenon in Many Guises*, 2 REV. GEN. PSYCHOL. 175, 211 (1998) ("Our natural tendency seems to be to look for evidence that is directly supportive of hypotheses we favor and even, in some instances, of those we are entertaining but about which [we] are indifferent.")

litigating to preserve its supra-competitive profits, whereas the plaintiff competitor is generally litigating to obtain only a competitive profit level, rather than replace the monopolist entirely. This asymmetry generally gives the defendant the financial incentive to spend more resources on developing evidence favorable to its case. If the court applies the usual preponderance of the evidence standard, this asymmetry in the evidence presented will tend to skew the outcome in favor of the defendant.[27] For this reason, the observation that plaintiffs in such cases lose much more often than they win does not imply that their cases lack merit. To the contrary, the defendants' greater stakes lead to their victory over the plaintiffs more often than deserved on the merits of their cases. These distortions can be counteracted by reducing the plaintiff's relative burden of proof and raising the defendant's burden in one or more of the steps of the rule of reason.[28]

II. Competition Presumptions and Modern Species of the Rule of Reason

Absent the cost of information, errors, and other process costs, the optimal standard would be characterized as a full economic analysis that evaluates the likely procompetitive and anticompetitive effects of the conduct at issue and determines the overall effect on balance. As a starting point, recall the seminal *Chicago Board of Trade* decision, in which the Court presented the rule of reason legal standard as focused on detailed evidence of economic effects on competition:

> The legality of an agreement or regulation cannot be determined by so simple a test, as whether it restrains competition. . . . To determine that question, the court must ordinarily consider the facts peculiar to the business to which the restraint is applied, its condition before and after the restraint was imposed, the nature of the restraint, and its effect, actual or probable. The history of the restraint, the evil believed to exist, the reason for adopting the particular remedy, the purpose or end sought to be attained, are all relevant facts. This is not because a good intention will save an otherwise objectionable regulation, or the reverse, but because knowledge of intent may help the court to interpret facts and to predict consequences.[29]

This evaluation of the "power, purpose, and effects" of the agreement can be formidable and require substantial evidence and technical economic reasoning. Decision theory suggests that gathering as much information as possible is not necessarily the best approach, because obtaining perfect

---

[27] All else equal, the monopolist has more to lose than its rival has to gain in litigation, because if the rival wins, it will compete in a more competitive market. This is not always true, however, as in the case in which the rival has a significantly superior or highly differentiated product or substantially lower costs. For a technical analysis, see Erik Hovenkamp and Steven C. Salop, *Litigation with Inalienable Judgments*, 52 J. LEGAL STUD. 1 (2023).

[28] One way to do so would be to reallocate burdens from the plaintiff to the defendant by creating rebuttable presumptions on which the plaintiff can rely. Another would be to adjust the volume of evidence required to satisfy the burden. For example, the defendant might be required to establish additional required facts, or its standard of proof might be raised from "preponderance of the evidence" to "clear showing." The plaintiff's burden might be reduced analogously. See Louis Kaplow, *Burden of Proof*, 121 YALE L.J. 738, 758–62 (2012), which discusses how raising and lowering the evidence threshold required to convict affect the incidence of false positives and negatives.

[29] *Board of Trade of City of Chicago v. United States*, 246 U.S. 231, 238 (1918).

information is impossible and additional economic information can be difficult and expensive to obtain and interpret. Information may also be unreliable or muddy the waters, increasing the likelihood of adjudicative errors at trial. In a legal process in which the plaintiff has the ultimate burden of proof, requiring more information may unfairly skew the outcome at trial in the direction of the defendant and undermine deterrence by increasing the plaintiff's costs to sue, litigate, or win.

In response to these concerns, the "unstructured" rule of reason standard in *Chicago Board* evolved into a set of more structured standards based on the mix of presumptions about the competitive effects of types of conduct and case-specific evidence. As noted above, in *California Dental*, the Court termed this type of sliding scale as an "enquiry meet for the case."[30] An organizational structure has been formulated that sets multiple analytical steps that can be undertaken sequentially. Permutations have been added to allow the rule of reason analysis to be abbreviated for certain types of conduct in order to improve deterrence outcomes or reduce adjudicative errors at trial.

"Species" derived from the *Chicago Board* unstructured rule of reason are distinguished on the basis of the presumptive competitive effect of the type of allegedly anticompetitive conduct at issue. The competitive presumption may be anticompetitive, procompetitive, or neutral. Standards are also distinguished by the strength of the presumption, which may be rebuttable or irrebuttable (conclusive). Because presumptions may be stronger or weaker, the evidentiary burdens applied to each standard can vary.

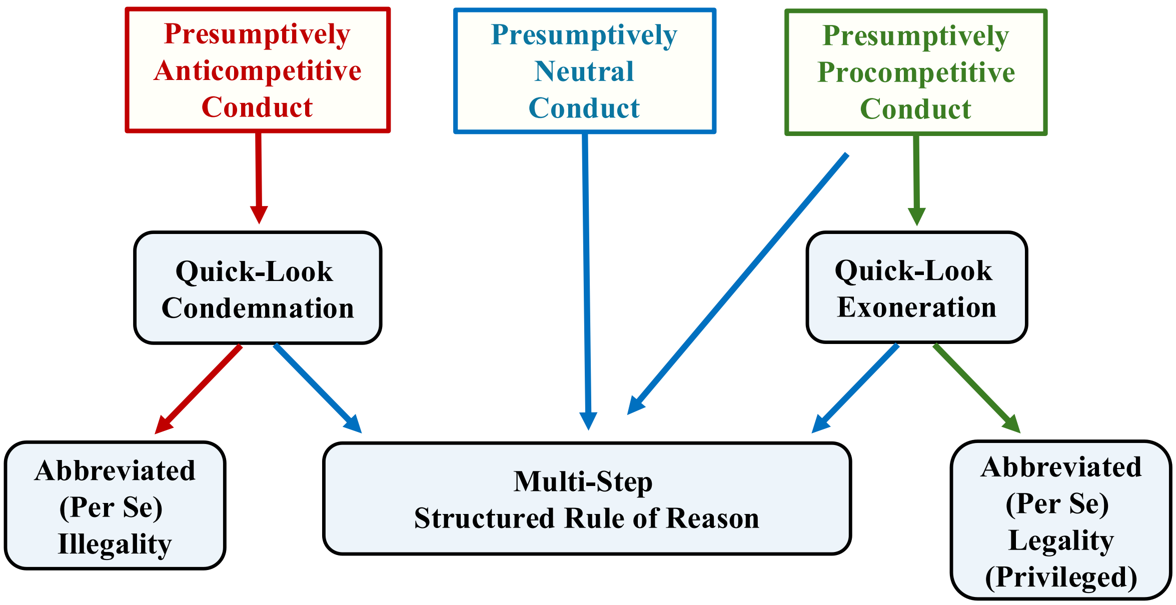
Five species of modern antitrust standards can be distinguished. Ranked in order from most to least interventionist, they are per se illegality, quick-look condemnation, multi-step structured rule of reason, quick-look exoneration, and per se legality. Although they are in some sense separate and distinct standards for different types of conduct, they should be seen as parts of a holistic, integrated analytic process linked to presumptions based on conduct and evidence presented to rebut or support the particular presumptions. Although the rule of reason is commonly associated with the analysis of agreements covered by Section 1, the same concepts can be or already are applied to Section 2 and Section 7. These different standards can be matched up to various categories of conduct, as set out below.

Figure 3.1 illustrates the standards and associated competitive presumptions that drive them. One can think of the determination of the appropriate competitive presumption for a category of conduct as a type of pre-step to determine the species of the rule of reason to apply. Once the presumption is applied to the conduct at issue in the case, the analysis is implemented under the appropriate standard or standards.

---

[30] *California Dental Association v. F.T.C.*, 526 U.S. 756, 758 (1999).

Figure 3.1 Modern species of the rule of reason



Three categories of presumptions can be distinguished: anticompetitive, neutral competitive, and procompetitive. These standards are explained in more detail below and applied to various practices I throughout this work.

A. Conduct Subject to a Neutral Competitive Presumption

For conduct assigned a neutral presumption, the relevant legal standard requires the plaintiff to show by a preponderance of the evidence that the conduct is competitively harmful. This neutral competitive category raises a threshold question. Does the fact that the burden of proof is placed on the plaintiff in the rule of reason imply that courts are treating the conduct as procompetitive? In my view, the answer is no. The plaintiff's burden is merely to show that the conduct is more likely than not (i.e., with a probability of more than 50 percent) to cause economic harm to counterparties in the relevant market. If the fact that the burden is on the plaintiff is necessarily said to imply a procompetitive presumption, this presumption is *de minimis*. Thus, the neutral presumption can be expressed as applying to conduct with relatively balanced likelihoods of competitive harms and competitive benefits.

Most categories of conduct are assigned a neutral presumption. Examples are most nonprice horizontal agreements, such as *Chicago Board*; vertical agreements, such as *Sylvania* and *Leegin*; exclusives, such as *Tampa Electric* and *Dentsply*; and mergers, such as *Arch Coal*, all of which fall short of the structural presumption.

For conduct with a neutral presumption, the court applies a multi-step burden-shifting detailed economic analysis of the likely anticompetitive harms, procompetitive benefits, and resulting overall effects of the conduct. The steps are undertaken sequentially. In Step 1, the plaintiff bears the initial burden of producing sufficient evidence of anticompetitive harm, which normally includes direct evidence of competitive harm or likely harm in light of a finding of market power. If it finds such evidence, in Step 2 the defendant bears the burden of rebutting it and/or providing sufficient evidence of procompetitive benefits. If it does, in Step 3 the burden shifts back to the plaintiff to rebut the defendant's evidence of benefits; show that the overall effect is anticompetitive; or show that there is alternative, less restrictive conduct that would achieve the benefits while having significantly less adverse competitive effects.

Antitrust trials are not formally divided into these steps. (During trial, the plaintiff typically provides evidence that supports the lack of procompetitive efficiencies; it may offer additional evidence in its rebuttal case.) However, the evidence is evaluated within this structure, and the parties' briefs are organized according to it.

Although the multi-step structured rule of reason is the baseline antitrust legal standard, numerous cases involving a variety of types of conduct have applied abbreviated standards. They involve conduct that is subject to an anticompetitive presumption.

B. Conduct Subject to an Anticompetitive Presumption

For categories of conduct with relatively obvious concerns about competitive harms and a low likelihood of competitive benefits, the court may apply an abbreviated standard of per se illegality or quick-look condemnation. This anticompetitive presumption applies to horizontal price restraints, such as *Trenton Potteries* and *BMI,* and market division, such as *Palmer v BRG* (as discussed in in Chapter 3). Before *Leegin,* it was applied to vertical price restraints. When conduct is treated as presumptively anticompetitive, the defendant faces a burden of producing cognizable evidence to rebut the presumption. Only certain evidence is considered cognizable.

If the defendant satisfies this rebuttal burden with cognizable evidence, the court will revert to Step 1 of the multi-step structured rule of reason. If the defendant fails to satisfy this burden, the conduct is condemned without the need for the plaintiff to produce evidence of anticompetitive harms. This abbreviated finding of a violation may be characterized as quick-look condemnation, abbreviated condemnation, or per se illegality, depending on the type of failed rebuttal evidence proffered by the defendant.

The classic example is price fixing (joint pricing by competitors that is not accompanied by lower costs or a new or superior product). Although naked price fixing— price fixing that is devoid of plausible cost or product benefits—may appear to involve a direct condemnation as per se illegal (i.e., a separate arrow going directly from the category of conduct to the "per se illegal" box in Figure 3.1), the determination must first be made that the conduct is naked.

In order to satisfy the rebuttal burden, the defendant must provide evidence of plausible procompetitive benefits. If the defendant instead attempts to rebut solely with evidence that there is no evidence of competitive harm—that the conduct is not capable of causing competitive harm because the defendants lack market power or because residual competition can or does occur—or that competition would be so intense as to be ruinous or harmful to society, that rebuttal evidence will be treated as non-cognizable and the court will invalidate the conduct. The court may label the conduct as per se illegal. In order to escape condemnation with cognizable evidence, the defendant must offer evidence that the conduct will plausibly have procompetitive effects (by, e.g., introducing a new or improved product or reducing costs). If this justification evidence is insufficient or unconvincing, the court will find a violation under the quick-look condemnation rubric.

In *Board of Regents*[31] and *General Leaseways,*[32] defendants failed in their attempts to formulate cognizable justification. Such failures at the quick-look stage have become rarer in current jurisprudence, as defendants have become more skillful in formulating cognizable justifications. When, for example, the Ivy League college financial aid agreement was first uncovered and attacked, one of the defendant's justifications was that the choice of college should not depend on the relative costs of different schools. By the time the case reached the Third Circuit, the justification was that a diverse student body would increase the educational value to all students and that the agreement was necessary to expand the number of students obtaining sufficient financial aid. The court found this justification sufficient to trigger the full rule of reason.[33]

The abbreviated condemnation (per se illegality) standard is explained in *Northern Pacific* as a conclusive anticompetitive presumption:

> 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, and therefore illegal, without elaborate inquiry as to the precise harm they have caused or the business excuse for their use.[34]

The court's rationale is explained in language that amounts to decision theory, focusing on avoiding costs that do not improve the accuracy of the decision:

> This principle of *per se* unreasonableness not only makes the type of restraints which are proscribed by the Sherman Act more certain to the benefit of everyone concerned, but it also 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—an inquiry so often wholly fruitless when undertaken.[35]

---

[31] *NCAA v. Board of Regents of the University of Oklahoma*, 468 U.S. 85 (1984).

[32] *General Leaseways, Inc. v. National Truck Leasing Association,* 744 F.2d 588 (7th Cir. 1984).

[33] *United States v. Brown University*, 5 F.3d 658 (3d Cir. 1993). In my view, this justification amounted to little more than a ruinous competition justification in disguise. Each college could have unilaterally increased its financial aid budget.

[34] *N. Pac. Ry. Co. v. United States*, 356 U.S. 1, 5 (1958).

[35] *Id.*

The quick-look condemnation standard was formulated and refined in several collusive conduct cases involving horizontal restraint. In *BMI*[36] and *California Dental Association,*[37] in which involved presumptively anticompetitive joint pricing and advertising restraints, the defendants offered plausible procompetitive efficiency claims, which led the Court to mandate reversion to the multi-step structured rule of reason. In *BMI*, the key efficiency claims were that the joint pricing involved in the creating of the "blanket license" created a superior new product and lower transactions costs. In California Dental, one claim was the advertising was inherently deceptive. By contrast, in *Board of Regents,*[38] the Court found a violation under what amounted to the quick-look condemnation standard because the proposed justifications by the National Collegiate Athletic Association (NCAA) did not pass muster. Given this failure to justify the conduct, the Court was comfortable condemning it as a naked restraint without the cost and potential error of further analysis.

The essence of the per se illegality standard is that the plaintiff is not required to provide evidence of anticompetitive effects. Instead, the high likelihood of anticompetitive effects is inferred from conduct that lacks a cognizable efficiency justification.

Application of this liability standard may require certain evidence, not simply the identification of the practice. For example, the per se rule against tying set out in *Jefferson Parish*[39] is applied only after a showing of market power. *BMI* makes it clear that the plaintiff's need to prove anticompetitive effects is eliminated only for joint pricing practices in which the defendant is unable to show plausible efficiencies (which is why it is called a quick look).[40] Stated differently, the per se rule for price fixing is applied only after the evidence claiming efficiency benefits is rejected.

Per se illegality and quick look to condemn are normally associated only with Section 1, but they can also be applied to Section 7, which prohibits mergers that lead to monopoly market shares (structures that "tend to create a monopoly"). This language might be interpreted as an anticompetitive presumption.

Similarly, the 1963 *Philadelphia National Bank*[41] merger case mandated an anticompetitive presumption for mergers that substantially increase the market share of merging firms operating in a highly concentrated market—an anticompetitive presumption that continues to guide merger enforcement. The history of Section 2 also includes conspiracies to monopolize conduct that may be treated as presumptively anticompetitive.[42]

---

[36] *Broadcast Music, Inc. v. CBS, Inc*., 441 US 1 (1979).

[37] *California Dental Association v. F.T.C.*, 526 U.S. 756 (1999).

[38] *NCAA v. Board of Regents of the University of Oklahoma*, 468 U.S. 85 (1984).

[39] *Jefferson Parish Hospital Dist. No. 2 v. Hyde*, 466 U.S. 2 (1984).

[40] *Broadcast Music, Inc. v. CBS, Inc*., 441 US 1 (1979).

[41] *United States v. Philadelphia Nat. Bank*, 374 U.S. 321 (1963).

[42] See, e.g., *United States v. Buchalter*, 88 F.2d 625 (2d Cir. 1937); *Shapiro v. United States*, 103 F.2d 775 (2d Cir. 1939). For a list of conspiracies to monopolize brought as criminal Section 2 cases, see Daniel Crane, *Criminal Enforcement of Section 2 of the Sherman Act: An Empirical Assessment*, 84 ANTITRUST L.J. 753 (2022).

Single-firm conduct is not normally associated with an anticompetitive presumption. However, it could make economic sense to treat as presumptively anticompetitive criminal exclusionary conduct such as burning down a rival's factory or threatening violence on an actual or potential competitor.[43] The quick look to condemn might be applied to "naked" exclusionary rights such as Alcoa's payment to some hydroelectric generators from whom it purchased no electricity in order to prevent any sales to rival aluminum.[44] U.S. Tobacco's alleged destruction of rivals' racks at retail outlets could be another possible example.[45] More generally, exclusionary conduct might be condemned under a type of quick look that does not require the showing of anticompetitive effects on consumers if the plaintiff can establish that the conduct forecloses (e.g., raises the cost of) all significant competitors and lacks a plausible efficiency justification.[46]

C. Conduct Subject to a Procompetitive Presumption

For categories of conduct with presumptive procompetitive benefits and a low likelihood of competitive harms, courts normally apply the multi-step rule of reason. It is captured by the arrow from the presumptively procompetitive category of conduct box to the multi-step rule of reason in Figure 3.1. Procompetitive presumptions are applied more in Section 2 and Section 7 cases than in Section 1 ones, as discussed below.

However, a court could choose first to apply an intermediate step analogous to the approach used for presumptively anticompetitive conduct. That is, it could evaluate in a quick-look fashion whether to exonerate the conduct. It might conclude that the conduct is privileged—a standard that amounts to per se legality if certain conditions are met.

If presumptively procompetitive conduct were subject to an initial quick look, the plaintiff would face the burden of producing evidence, either by rebutting the applicability of the procompetitive presumption to this case or by showing that the conduct in this case has a plausible likelihood of producing competitive harm. The latter rebuttal would involve a showing of market power, including significant entry barriers, or direct evidence of anticompetitive harm from which market power could be inferred. If the plaintiff satisfies this burden, the court will reject the quick look but revert to Step 1 of the multi-step rule of reason. If the plaintiff fails to satisfy this burden, the conduct will be exonerated on an abbreviated basis without the need for the defendant to produce case-specific evidence of lack of competitive harms or show that the benefits outweigh the harms. As with quick-

---

In 2020, Florida Cancer Specialists & Research Institute LLC (FCS) was charged with conspiring to allocate medical and radiation oncology treatments for cancer patients in Southwest Florida and agreed to pay a fine of $100 million. https://www.justice.gov/archives/opa/pr/leading-cancer-treatment-center-admits-antitrust-crime-and-agrees-pay-100-million-criminal.

[43] *Arizona v. Myman*, No. C607584 (Ariz. Sup. Ct. Oct. 30, 1986).

[44] *United States v. Aluminum Co. of Am*., 148 F.2d 416, 422 (2d Cir.1945). For further discussion, see Thomas G. Krattenmaker & Steven C. Salop, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power over Price*, 96 YALE L.J. 209 (1986).

[45] *Conwood Co., L.P. v. U.S. Tobacco Co.*, 290 F.3d 768, 788 (6th Cir. 2002).

[46] See, e.g., Jonathan B. Baker, *Exclusion as a Core Competition Concern*, 78 ANTITRUST L.J. 527, 548 (2013); Daniel Francis, *Monopolizing by Conditioning*, 124 COL. L. R. 1917, 1994-96 (2024).

look condemnation, the court may apply or reject this abbreviated standard after a full trial or on a motion to dismiss or for summary judgment.

Because the plaintiff can rebut the procompetitive presumption with plausible evidence of market power or competitive harm, quick-look exoneration arguably adds little to the decision framework. Even if the conduct is not treated as presumptively procompetitive, the plaintiff needs to provide evidence of competitive harm (which may involve direct or indirect evidence of market power) in Step 1 of the multi-step rule of reason.

Although Judge Robert Bork arguably applied this standard in *Rothery*,[47] it is not a common category in practice. The standard can, however, have bite for certain categories of conduct that are so likely to provide such substantial benefits that they can be treated as presumptively procompetitive. For these categories, the plaintiff must identify its specific allegations of anticompetitive harm at the initial (quick-look) stage. If the allegations of harm are cognizable and plausible, the case will be litigated under the multi-step rule of reason. Some of these allegations of harm can be rejected as implausible, inherently invalid, or non-cognizable (just as some justifications are rejected for presumptively anticompetitive conduct). If they are, the case can be summarily dismissed, in what can be characterized as quick-look exoneration, or the conduct can be deemed privileged or per se legal.[48] I did not draw an arrow directly to the per se legality box in Figure 3.1, because the analysis does involve a quick look to determine whether that standard applies in the same way that a quick look formally precedes application of per se illegality.

Consider, for example, unilateral price increases by a firm with monopoly power. If the allegation of harm is simply that the price increase will harm all or certain groups of consumers, that allegation will be rejected as non-cognizable. The simple exercise of monopoly power obtained on the merits purely by setting high prices—without excluding competitors—is considered privileged exploitation. If the allegation is not pure exploitation and the price increases are accompanied by certain types of plausible exclusionary conduct, the case will be litigated under the multi-step rule of reason.

Alternatively, consider a price cut by a monopolist in response to entry. If the allegation is that the price cut will cause harm by forcing competitors to exit or by deterring entry, the court will look to see whether the plaintiff is alleging that the discounted price is below the defendant's cost. If it is not, the allegation of harm will be rejected as non-cognizable; if the plaintiff alleges below-cost pricing, the case will proceed.

This language is another way of framing the claim that *Brooke Group* treated allegedly predatory price cuts that remained above cost as per se legal.[49] Even if the plaintiff has solid evidence of anticompetitive but above-cost price cuts that will likely cause exit and recoupment, it is not

[47] R*othery Storage & Van Co. v. Atlas Van Lines, Inc.*, 792 F.2d 210 (CADC 1986).

[48] *Per se legal* (and *per se illegal*) may not be the clearest terms, given the historical use of the term.

[49] *Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp*., 509 U.S. 209 (1993).

permitted to offer that evidence. The alleged harm is treated as non-cognizable, because the conduct is privileged.

The Court has justified this legal standard for price cuts that remain above costs in terms of errors and optimal deterrence that involve decision-theory reasoning. It has reasoned that this per se legal standard is supported by the fact that this conduct is presumptively competitive because it has a very low probability of harm—that is, that "predatory pricing schemes are rarely tried and even more rarely successful."[50] This reasoning would suggest that a full rule of reason would tend to uncover few instances in which the pricing was anticompetitive, which reduces the value of undertaking the analysis and risking adjudicative costs. The Court further explained that a full analysis would tend to lead to false positive errors. It quoted *Matsushita* for the proposition that "mistaken inferences" and the resulting false condemnations "are especially costly, because they chill the very conduct the antitrust laws are designed to protect."[51] This approach can be interpreted in decision- theory terms as yielding fewer false positives, because anticompetitive instances are unlikely to be found.

The Court also applied what amounts to a per se legality standard to certain "unconditional" refusals to deal in *Trinko*, using decision-theory concepts and language. It raised concerns about over-deterrence, noting that "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."[52] It stated that "the cost of false positives counsels against an undue expansion of §2 liability."[53] In this regard, it repeated the statement in *Matsushita* (repeated in subsequent Section 2 cases) that false positives chill the competitive conduct that antitrust law is designed to protect. It also suggested that a rule of reason standard that would require the court to set prices would lead to further errors, because price setting is beyond the competence of generalist courts.

The quick-look exoneration standard was mentioned (though not applied) in *Alston,* where the Court stated that "some restraints may be so obviously incapable of harming competition that they require little scrutiny" and that such is the case when a defendant lacks market power.[54] It is not clear, however, that its examples really amounted to a quick look. The *Rothery*[55] and *Polk Bros*[56] decisions cited for this proposition can be interpreted instead as simply applying Step 1 in the multi-step rule of reason, not as an alternative legal standard. The question is how far to take this quick-look exoneration standard. If it were applied to horizontal price restraints based solely on defendants' lack of market power, it would collide head on with the rule of per se illegality of naked price fixing.

---

[50] *Id.* at 226 (*quoting Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574 (1986)).
[51] *Id.*
[52] *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004).
[53] *Id.* at 414.
[54] *Nat'l Collegiate Athletic Association v. Alston*, 594 U.S. 69, 88 (2021).
[55] *Rothery Storage & Van Co. v. Atlas Van Lines, Inc.*, 792 F.2d 210 (CADC 1986).
[56] *Polk Bros., Inc. v. Forest City Enterprises, Inc.*, 776 F.2d 185, 191 (CA7 1985).

III. Setting Evidentiary Standards

Even within each of these categories, courts set evidentiary standards. For example, *Monsanto*[57] and *Copperweld*[58] set a high evidentiary burden for proving a cartel agreement. A decision-theory interpretation is that this high burden is justified by the fear of deterring procompetitive unilateral conduct that forms the basis of the market economy. As another example, to escape the Section 1 per se rule applied to joint pricing and shift the burden of proof back to the plaintiff, the rebuttal standard requires the defendant to produce evidence that indicates merely a "plausible" procompetitive efficiency.

The burden of proof placed on plaintiffs is lower for horizontal mergers adjudicated under Section 7 of the Clayton Act than for horizontal restraints adjudicated under Section 1 of the Sherman Act. Although the Section 1 legal standard for unreasonable restraint has been interpreted as requiring a showing that the restraint "is likely" to have substantial anticompetitive effects, the text of Section 7 indicates a lower standard of proof, requiring only that the merger "may be" likely to have substantial anticompetitive effects. This lower standard has led to a merger law that includes an anticompetitive presumption based on the combined market share of the merging parties and market concentration. Indeed, in the *Philadelphia National Bank*[59] merger case, the Court mandated a rebuttal standard of a "clear showing" that competition would not be weakened, although this rebuttal standard was reduced merely to "showing" in a DC Circuit opinion (*Baker Hughes*),[60] which was penned by Clarence Thomas when he served on that court. An economic rationale for this presumption is discussed with respect to mergers in Part IV.

IV. Determining the Appropriate Competitive Presumption

Appropriate legal standards depend on legislators' and courts' assumptions regarding several factors, including the behavior of the markets and their presumption regarding the competitive effects of the conduct, which determines the competitive presumption; the likelihood and cost of adjudicative and deterrence errors; the cost and reliability of potential evidence; the party with the better access to the evidence; and the cost of delay. Decision theory counsels that optimal deterrence of potential anticompetitive conduct depends on the relative likelihood and costs of over-deterrence (false positives) and under-deterrence (false negatives) and should optimally balance the expected costs. This optimal balance for particular categories of conduct would be based on assumptions by the legislatures and appellate courts about the magnitude of these factors. Determining the appropriate competitive presumption for the category of conduct is a key step in setting the appropriate legal standard for the category of conduct.[61]

---

[57] *Monsanto Co. v. Spray-Rite Service Corp.*, 465 U.S. 752 (1984).

[58] *Copperweld Corp. v. Independence Tube Corp.*, 467 U.S. 752 (1984).

[59] *United States v. Philadelphia Nat. Bank*, 374 U.S. 321 (1963).

[60] *United States v. Baker Hughes Inc.*, 908 F.2d 981 (D.C. Cir. 1990).

[61] For detailed analysis, see Mark S. Popofsky, *Defining Exclusionary Conduct: Section 2, The Rule Of Reason, and the Unifying Principle Underlying Antitrust Rules*, 73 ANTITRUST L.J. 435 (2006).

A. The Role of Judicial Experience

Unfortunately, judicial experience derived from case law may not be a reliable guide to setting legal standards and burdens of proof. Most judges lack a deep understanding of economics. Judge Frank Easterbrook suggested that in the past, antitrust courts condemned as anticompetitive single-firm conduct that they did not understand. Courts may also rely on superficial prescriptions wrapped in seemingly rigorous economic theory in cases in which that theory is actually applicable only under very narrow conditions.[62]

Sufficient informative data may be lacking as a result of selection bias. To illustrate its role with an extreme example, suppose that overtime parking were subject to a $1,000 fine. In this case, virtually all overtime parking cases would involve driver mistakes, accidents, extraordinarily beneficial circumstances, or the behavior of millionaires. If courts imposed these fines, it would be difficult from observed behavior to predict the impact on overtime parking if the fine were lowered to $50 or $10.

Another facet of the selection bias problem is that easy cases under a particular legal standard tend to settle. Whether a case is easy or hard generally depends on the current legal standard, not the hypothetical "optimal" standard. The conduct that created the dispute and the selection of cases that reach the trial, let alone the appellate, courts are affected by the current legal standard and the behavior of the litigants, both of which can limit its applicability to conduct in the event that the legal standard is changed.

Selection bias can also result from unobserved deterrence. If the legal standard is per se illegality, evidence will not be forthcoming to show that this standard might be inappropriate. If the legal standard creates a strong anticompetitive presumption, most cases that reach trial may be matters in which the defendant has a strong procompetitive rebuttal. An appellate court might therefore conclude that the presumption is inappropriate and weaken it. This conclusion could be inappropriate, because the court does not get to observe all the anticompetitive conduct that is deterred by anticompetitive presumption. This selection bias is an inherent path dependence problem, particularly with respect to predicting the effects of more lenient rules.

As discussed earlier, both the evidence presented by the parties and the outcomes of the cases that reach trial are affected by the parties' relative litigation efforts, which, in turn, depend on their respective stakes in the case. This concern is important for private litigation, which can be illustrated with a numerical example.

Consider a case in which prevailing would allow the defendant to earn monopoly profits of $200 rather than competitive profits of $50, an incremental value of winning of $150. Suppose that the allegedly excluded fringe firm would earn competitive profits of $50 if it wins and $10 if it loses, leading to an incremental value of winning of $40. In this case, the defendant has the incentive to engage in much more costly litigation effort to develop and present exculpatory evidence than the

---

[62] One example often discussed in the context of tying and vertical mergers, is the "single monopoly profit" theory, which erroneously appeared to support the conclusion that vertical mergers and vertical restraints in unregulated markets can virtually never create or maintain monopoly power.

plaintiff to develop inculpatory evidence. This asymmetry in the financial stakes will tend to bias the trial outcomes in favor of such defendants relative to the underlying merits. If the plaintiff is highly likely to win because the conduct was egregious, there is ample room to negotiate a settlement. A settlement in the $41–$149 range would benefit both parties and avoid additional litigation costs.

B. The Role of Economics

Historically, decision-theory considerations led to the triggers shown in Table 3.1. These distinctions are apparent in older cases; they are applied less often today.

Table 3.1 Level of harm associated with selected traditional sources of presumptions

Indicator	More likely to result in harm	Less likely to result in harm
Type of conduct	Concerted	Unilateral
Type of firm imposing restraints	Firm with market or monopoly power	Firm lacking market or monopoly power
Share of valid antitrust market affected	Large	Small
Nature of vertical agreements	Exclusive	Nonexclusive
Type of restraints	Price	Nonprice

In a decision-theory analysis, the appropriate legal standards depend on assumptions regarding the behavior of the markets. In an influential article published in 1984, Judge Frank Easterbrook argued that false positive errors were the more serious concern and that courts should therefore apply an anti-enforcement bias.[63] These arguments were based on the following contestable assumptions:

- Cartels and anticompetitive coordination conduct are inherently unstable, as a result of incentives for profitable deviations by maverick competitors.
- Markets rapidly self-correct in response to anticompetitive exclusionary conduct through entry.
- Attempts to exclude competitors are unlikely to succeed, because the excluded rivals can engage in profitable counter-strategies.

[63] For classic articulations, see Frank H. Easterbrook, *Limits of Antitrust*, 63 TEXAS L.R. 1 (1984). See also Robert Bork, THE ANTITRUST PARADOX (1978).

- Less efficient competitors do not contribute to substantial competition or efficient market performance.

- Conduct prevalent in competitive markets is likely efficient and thus highly unlikely to harm competition when used by a dominant firm or oligopolists.

- Deterring profitable exclusion that leads to consumer harms from higher prices will tend to reduce innovation that yields consumer benefits.

- Vertical mergers and exclusives do not cause harm, because there is a single monopoly profit that can be obtained without these practices.

Commentators have criticized the economic validity of all of these assumptions, as discussed in Chapter 4.[64] Some are out of date; others may never have been true. As University of Pennsylvania Professor Herbert Hovenkamp noted, "The economic case for an error cost bias against antitrust enforcement was losing ground at the time it was articulated in the 1980s and is even less defensible today. Further, it fails to protect antitrust goals of facilitating high output and low prices."[65]

Whatever assumptions are made to support the competitive presumptions should be rationally based. One rational basis is industrial organization economic analysis: how the various categories of conduct affect competition and the associated necessary and sufficient conditions for leading to either competitive benefits or competitive harms. Another is economic experience: empirical studies of the impact of conduct in specific markets and contexts. Empirical economic studies—such as retrospective empirical analyses of consummated mergers—can provide useful information, although learning from these studies is subject to certain limitations:

- The breadth of the empirical studies may be limited to industries on which data are available, which may limit their broader applicability.
- It may be difficult to gauge the cause of the effects of observed behavior. Price may rise from market power but also from quality increases; the price/cost margin may rise from increased market power but also from cost reductions or quality increases. If a study focuses on price, it may ignore the effects on innovation. The design of some studies may not untangle these effects, and data limitations may make it impossible to do so. It may also be difficult to control for other causal factors. If, for example, the merged firm raises price in response to its innovation, the price might not have increased by as much if the merger had not foreclosed rivals. If the firm already had monopoly power and was alleged to raise entry barriers, the harm from the merger would be a failure of the price to fall rather than an increase in price.

---

[64] See, e.g., Jonathan B. Baker, *Taking the Error Out of 'Error Cost' Analysis: What's Wrong with Antitrust's Right*, 80 ANTITRUST L.J. 1 (2015); Andrew I. Gavil & Steven C. Salop *Probability, Presumptions and Evidentiary Burdens in Antitrust Analysis: Revitalizing the Rule of Reason for Exclusionary Conduct*, 168 U. PA. L.R. 2107 (2020); Herbert Hovenkamp, *Antitrust Error Analysis*, 242 U. PA. J. BUS. LAW 293, 302 (2022).

[65] Herbert Hovenkamp, *Antitrust Error Analysis*, 242 U. PA. J. BUS. LAW 293, 302 (2022). After reviewing the failure of the economic arguments supporting this bias, Hovenkamp concludes that its use by powerful profit-seeking interest groups "has turned the error cost anti-enforcement bias into an important vehicle for rent seeking at the expense of consumers, labor, and others who stand to profit from a more competitive economy." *Id.* at 349.

- Even if a class of merger could be shown retrospectively to be anticompetitive most of the time, it is not clear that harmful mergers could be predicted in advance.[66]
- Estimating the competitive effects of consummated mergers is different from estimating the impact of the legal rule on deterrence, as this deterrence effect requires information about mergers that are not proposed. Although the direction of the impact of changes in the legal standard can be predicted, the impact on deterrence is hard to measure directly unless the legal rule changes. The use of empirical economic studies for designing legal standards can also be limited because the conduct under study may have been affected by current legal standards and might change if the legal standards were altered, as discussed with respect to judicial experience.

The fact that knowledge can increase over time—from economic studies and experience with certain legal rules and market conditions that change as the economy evolves—makes it essential to continue to monitor market conduct and legal standards, in order to appropriately update the presumptions and legal standards.[67] For this reason, it is important to reconsider old precedents as additional learning is accumulated from newer cases or studies. If, for example, it turns out that the narrow category of conduct is less concerning than previously expected, the evidentiary standard should become more defendant-friendly. As a result of Chicago School scholarship on nonprice vertical restraints, for example, the rule of reason replaced per se illegality in *Sylvania,*[68] and the evidence required to establish a vertical price agreement was increased in *Monsanto.*[69]

There is no consensus among industrial organization economists about the best antitrust policy. Both sides of most antitrust cases find expert economists to support their position. Appellate courts are often presented with multiple amicus briefs by academic economists that are either in direct conflict or speak past one another; every significant antitrust trial involves dueling economic experts that disagree on the proper outcome. This diversity may involve different economically rational interpretations of the facts. A less charitable interpretation is that some economists have flexible opinions, depending on who hires them. The diversity of opinion may also be affected by confirmation bias and political or ideological differences that affect their interpretations of the facts—and may even be the sole determinant of their conclusions—as discussed below.

These criticisms notwithstanding, it would be a grave mistake to ignore economics and economists. All of these criticisms and limitations likely apply to an even greater extent to the market analysis of non-economists and commentators who wish to downplay economics (“anti-economists”), who may apply an even less sophisticated and more biased approach or fail to appreciate basic economic concepts regarding markets and market competition on which virtually all economists agree.

---

[66] Dennis W. Carlton, *How To Make Sensible Merger Policies?* NETWORK LAW REV. (September 14, 2022).

[67] One complication is that an existing legal rule can impede learning. For example, an airtight rule of per se illegality would provide little information, because it might deter almost all procompetitive conduct. In this regard, replacing per se illegality with a broader initial quick-look inquiry into efficiency benefits in *BMI* represented a productive change in the legal analysis.

[68] *Continental T.V., Inc. v. GTE Sylvania Inc.*, 433 U.S. 36 (1977).

[69] *Monsanto Co. v. Spray-Rite Service Corp.*, 465 U.S. 752 (1984).

C. The Role of Ideology and the Triple Helix

Justice John Roberts once likened judges to baseball umpires calling balls and strikes. Economists like to think that is what they do. But the truth is that judges, economists, and other commentators do not have an agreed-upon strike zone. Indeed, as improved cameras and sensors have shown, not all baseball umpires use the same strike zones. The "optimal" strike zone depends on fans' preferences for erroneous strikeouts versus erroneous walks and their enjoyment from a pitching duel versus a high-scoring home run derby.

Another driver of competition presumptions is political and economic ideology. Political ideology creates the notion of a triple helix of law, economics, and ideology. Ideology is clearly a factor behind legislators' view, but it can also affect courts and economists. It may involve an overarching belief in the political, social, or economic benefits of a laissez-faire approach or an overarching suspicion of corporations and markets. It may also involve the degree of concern about and/or attitude toward income equality, the political power of different groups, and similar issues. Some observers who see laissez-faire markets as enhancing economic liberty and economic efficiency by facilitating private cooperation may be willing to accept the economic inequality that may come with it. Others see laissez-faire markets as involving highly asymmetric bargaining power and inefficient strategic behavior that leads to the entrenchment of economic power and the exploitation of the weak.

An individual's economic ideology may be based on and rationally justified by economic analysis and economic evidence. Causation can also run in the opposite direction, however, with economic analysis and interpretations of the evidence driven, consciously or unconsciously, by an individual's political or philosophical ideology. Yale Law School professor George Priest explained the origins of Chicago School economic analysis as follows: "Looking back on those efforts, law and economics, as developed by [Aaron] Director and [Ronald] Coase, was not exactly ideological, but derived from what might be called a deeply held belief system that political interference in market activities interfered with freedom and reduced societal welfare."[70]

Interpretation of evidence by individuals with prior beliefs also may be significantly affected by confirmation bias, which Judge Posner defined as "the well-documented tendency, once one has made up one's mind, to search harder for evidence that confirms rather than contradicts one's initial judgment. That is, when evaluating mixed evidence, it is common for people to ignore the evidence that is contrary to their prior belief and stress evidence that supports that belief."[71] Judges, legislators, and economists can all be affected by confirmation bias. They can also be affected by financial self-interest, group identity, animus toward certain groups, or even a quest for personal power and influence.

---

[70] George L. Priest, *The Limits Of Antitrust And The Chicago School Tradition*, 6 J. COMP. LAW ECON. 1 (2009).

[71] Richard A. Posner, HOW JUDGES THINK 111 (2008). See also e.g., Raymond S. Nickerson, *Confirmation Bias: A Ubiquitous Phenomenon in Many Guises*, 2 REV. GEN. PSYCHOL. 175, 211 (1998) ("Our natural tendency seems to be to look for evidence that is directly supportive of hypotheses we favor and even, in some instances, of those we are entertaining but about which [we] are indifferent.").

This analysis creates a policy dilemma. If economists do not agree, judges lack a deep understanding of economics and observe a biased sample of cases, and both groups' views are at least partially driven by ideology and reinforced by confirmation bias, how can sensible antitrust rules be achieved? The hope is that the "wisdom of crowds" of appellate courts, government enforcers, and scholars with differing views—as summarized in hearing transcripts, blue ribbon panels, and guidelines—will ultimately point antitrust law in the right direction.[72] The alternative is a power struggle or some type of negotiated outcome among competing political coalitions.[73]

V. Technical Decision-Theory Analysis: Optional Background Reading

Decision theory is a statistical and economic methodology that can be used to make decisions that minimize error costs.[74] These errors fall into two categories: imperfect deterrence and erroneous decisions given a legal standard. Avoiding these costs involves both setting the legal standard and sequencing the steps of the decision process.

Decision theory flows from Bayesian probability theory, in which the decision maker begins with a "prior" probability, gathers information, and then forms a "posterior" probability by rationally combining the prior probability and the new information. For example, a plaintiff's lawyer can decide whether to take a case on contingency based on his or her assessment of the strength of the case (the probability of winning), the likely damages or settlement value in the event of a win, and the cost of taking the case. After gathering additional information in discovery, the lawyer would update these expectations.

This same approach can be applied to legal decision making by substituting the term *presumption* for the Bayesian concept of prior probability. One can conceptualize having an initial presumption regarding the more likely competitive effect for a category of conduct. The court then analyzes and evaluates the additional evidence provided by the litigants to supplement the presumption and reach its decision.

Bayesian probability theory can also be used to evaluate and weigh the evidence. Evidence is more probative if it clearly points toward guilt or innocence rather than being consistent with both but with somewhat different probabilities. Facts associated solely with one of the two outcomes provide the best type of evidence; facts that are equally consistent with either outcome lack probative value.

---

[72] For example, there have been several major hearing cycles in antitrust in the past 30 years. See the Federal Trade Commission's (FTC's) 1995 Global and Innovation-Based Competition Hearings, https://www.ftc.gov/news-events/events/1995/10/global-innovation-based-competition-hearings; the Antitrust Modernization Commission's 2007 report, https://govinfo.library.unt.edu/amc/; and the FTC's 2018–19 Hearings on Competition and Consumer Protection in the 21st Century, https://www.ftc.gov/enforcement-policy/hearings-competition-consumer-protection.

[73] Jonathan B. Baker, *Competition Policy as a Political Bargain*, 73 ANTITRUST L.J. 483 (2006); Jonathan B. Baker, *Economics and Politics: Perspectives on the Goals and Future of Antitrust*, 81 FORDHAM L. REV. 2175 (2013) Filippo Lancieri, Eric A. Posner & Luigi Zingales, *The Political Economy of the Decline of Antitrust Enforcement in the United States*, 85 ANTITRUST L.J. L.J. 441 (2023); Jonathan B. Baker, *Not a Simple Story of Big Business Capture: An Essay on the Political Economy of Antitrust*, 85 ANTITRUST L.J. 521 (2023).

[74] The key work was carried out decades ago. See, e.g., Morris De Groot, OPTIMAL STATISTICAL DECISIONS 135–40 (1970); Howard Raiffa, DECISION ANALYSIS: INTRODUCTORY LECTURES ON CHOICES UNDER UNCERTAINTY 27–33 (1968); John Kaplan, *Decision Theory, and the Factfinding Process*, 20 STAN. L. REV. 1065, 1084–86 (1968).

Courts may also choose to exclude evidence that systematically leads to erroneous decisions or higher costs of adjudication.[75]

A. Setting the Legal Standard

A simple illustration of the way that error costs can occur is to consider a per se rule versus a perfectly accurate rule of reason standard. A 55 mile per hour (mph) speed limit law that allows no exemptions is a per se rule. A rule that gauged the "reasonable" speed in light of weather conditions, traffic conditions, and other factors is a rule of reason law.

Either standard can lead to adjudicative negative error from lack of enforcement, imperfect information, poorly calibrated or imprecise radar guns, or other causes.[76] These adjudicative errors can also lead to deterrence errors, which can lead drivers who would normally drive at 54 mph to slow down to 50 or less in order to avoid getting a ticket. An interesting counterintuitive result is that over-enforcement—sometimes convicting drivers who drive slower than 55 mph, because of imperfect radar guns—can actually lead to under- rather than over-deterrence, because a significant likelihood of being convicted when complying with the law reduces the incremental benefits of compliance relative to noncompliance.[77] If, for example, there is a significant chance of being convicted when driving 50 mph in a 55 mph zone, one might as well go 75 mph and have fun while getting home sooner. (For this reason, speeding fines should increase with the degree of the violation.)

The 55-mph per se standard could also lead to costly over- or under-deterrence relative to a pure rule of reason standard. For example, convicting a driver for driving 80 mph in her new Ferrari on an otherwise empty highway on a clear day would be an example of over-deterrence (false positive error) of a safe and joyful driving experience. Failing to convict a visually impaired octogenarian who is driving 55 mph during an ice storm would amount to under-deterrence (false negative error) of potential accidents and injuries to others.

B. Properly Combining Presumptions and Imperfect Evidence

When case-specific evidence is imperfect and costly, courts should not treat each case in isolation. Rather, they should rely on presumptions based on accumulated information and experience with the competitive effects of the category of conduct at issue. Doing so can reduce the rate and cost of adjudicative errors as well as the cost of adjudication.[78] Presumptions can improve the accuracy of

---

[75] See Fed. R. Evid. 403 ("The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence."); see also Fed. R. Evid. 702(c) (expert opinion testimony can be excluded if is not "the product of reliable principles and methods.").

[76] Assigning fewer troopers to monitor the road would reduce the likelihood of detecting speeding under either rule and lead to under-deterrence and the cost of additional car accidents from these false negatives.

[77] For a simple technical example, see Henrik Lando, *Does Wrongful Conviction Lower Deterrence?*, 35 J. LEGAL STUD. 327, 329–30 (2006).

[78] A vast body of literature exists on the proper interpretation of presumptions, including interpretations and criticism of *Coffin v. United States,* 156 U.S. 432 (1895). See, e.g., *The Presumption of Innocence in Criminal*

courts' decisions by adding information about the overall experience with a category of conduct to supplement or even substitute for the necessarily imperfect cost-specific evidence developed and presented at trial. Presumptions also have an impact on deterrence. They need to be taken into account.

To get a sense of the issue in a nonlegal context, consider an illustrative example of a medical test that focuses solely on adjudicative errors, not deterrence. Suppose it is known that a certain type of cancer affects only 1 percent of people in a particular cohort that shows certain symptoms. Also suppose experience has shown that a newly introduced medical test is 90 percent reliable (i.e., it yields erroneous results for 10 percent of patients). For every 10 tests given to patients with cancer, 1 is therefore a false negative, and for every 10 tests given to patients without cancer, 1 is a false positive.

Suppose now that a patient tests positive. Intuition might suggest that this patient is 90 percent likely to have cancer. But that intuitive is wildly incorrect. As the cancer is known to be relatively rare in the cohort of patients with this symptom, the positive test is much more likely to be a false positive than a true positive. In this case, the likelihood that the patient actually has cancer is much lower than 90 percent. In fact, the correct estimate of the patient's probability of having cancer is 8.3 percent.

Table 3.2 illustrates how this 8.3 percent is calculated.[79] In a typical sample of 1,000 patients, only 10 (1 percent of 1,000) have cancer, a "base rate" of 1 percent. As the medical test has a 10 percent error rate, 9 of those 10 will have a true positive test and 1 will have false negative test. Similarly, of the 990 that do not have cancer, 891 (90 percent of 990) will have a true negative test and 99 (10 percent of 990) will have a false positive test. Among the 108 patients that have positive test results, 99 will not have cancer but receive false positive test results and 9 will have cancer and receive true positive test results. Thus, if a patient has a positive test result, the likelihood that he or she actually has cancer is 8.3 percent (9/108), not 90 percent. This error of intuition is termed the *base rate fallacy*.

Cases, 3 WASH. & LEE L. REV. 82 (1941); George G. Olshausen, *Evidence: Presumptions as Evidence—A Reply*, 31 CALIF. L. REV. 316 (1943).

[79] For further details on the use of frequency tables for analysis of Bayes' Law probability issues, see Gerd Gigerenzer and Ulrich Hoffrage, *How to Improve Bayesian Reasoning without Instruction: Frequency Formats*, 102 PSYCH. REV. 684 (1995).

Table 3.2 Illustration of the base rate fallacy

	Cancer test result		
Actual state of health	Positive	Negative	Base rate (percent)
Has cancer	Number of true positives: 9	Number of false negatives: 1	1
Does not have cancer	Number of false positives: 99	Number of true negatives: 891	99
Total	Total number of positives: 108	Total number of negatives: 892	100

This analysis applies Bayes' Law,[80] a mathematical relationship among probabilities that provides a way to combine an initial probability estimate (prior) and additional information (support/evidence) to generate an improved probability estimate (posterior).[81] In the medical test example illustrated in Table 3.2, the base rate of 1 percent is the prior, the test results are the support/evidence, and the 8.3 percent probability that combines the prior and the evidence is the posterior.

The same logic applies to antitrust law: The prior/base rate for the narrow category of conduct is the presumption, the support/evidence is the case-specific evidence at trial, and the posterior is the likelihood of harm (e.g., whether the conduct at adjudicated at trial is more likely than not to be anticompetitive). In the medical test illustration, the probability of having cancer is analogous to consumers suffering anticompetitive effects.

As an exercise (rather than as a description of what a court would or should do), consider next the following antitrust example, which applies this Bayesian analysis step-by-step in a fully quantitative way.[82] Suppose a government plaintiff alleges that a monopolist's exclusive dealing agreements with

---

[80] More mathematically sophisticated readers may examine the definitions of the relevant conditional probabilities as follows: Bayes' Law is the statement the probability that outcome H occurs, conditional on evidence E occurring ($Pr\ (H|E)$) is given by $Pr\ (H|\ E) = Pr\ (E|SH)\ Pr(H)/Pr(E)$, where $Pr(E|H)$ is the probability that evidence E is found, conditional on outcome H actually occurring, and $Pr(H)$ and $Pr(E)$ are the conditional probabilities of outcome H and evidence F occurring. $Pr(H)$ is the prior probability, $Pr(H|E)$ is the updated, posterior probability, and the ratio $Pr(E|H)/Pr(E)$ is the support for the updating. For an essay on the history of Bayes' Law, see Stephen M. Stigler, *Who Discovered Bayes' Theorem?* 37 AM. STATISTICIAN 290 (198).

[81] A large body of literature exists on the Bayesian approach to law and evidence. See, e.g., D.H. Kaye, *What Is Bayesianism? A Guide for the Perplexed,* 28 JURIMETRICS J. 161 (1988); Richard D. Friedman, *A Presumption of Innocence, Not of Even Odds*, 52 STAN. L. REV. 873 (2000), and the references cited therein.

[82] To simplify the technical analysis, one can assume that the consumer harm from false convictions and false acquittals are identical and ignore deterrence effects. Suppose, for example, that the economic welfare effect of the conduct can take on only two values, +100 or -100. The appellate court's presumption represents the probability that a merger in this category is either truly anticompetitive (welfare harm of 100) or truly procompetitive (welfare benefit of 100).

the leading distributors is harmful and violates Section 2. The defendant alleges that the conduct is beneficial and procompetitive and the alleged victim has been able to compete vigorously despite the exclusives. Based solely on the case-specific evidence presented at trial by the government (as plaintiff) and the defendant, the district court might find that this monopolist's exclusive dealing was not more likely than not to be anticompetitive. Based on the case-specific evidence, suppose that the court finds that the likelihood that this exclusive dealing was harmful was 40 percent and that the likelihood of it being beneficial was 60 percent. Stated differently, the court's finding that the conduct in this case is beneficial has a 40 percent likelihood of being erroneous, in the sense of pointing in the wrong direction (in the same way that the finding of cancer was erroneous for 10 percent of patients).

Suppose that the plaintiff appeals, arguing that the trial court failed to admit expert testimony and empirical evidence regarding this category of conduct. Suppose also that one member of the appeals court panel has a master's degrees in economics and statistics as well as a law degree. The amicus briefs and judge's own analysis of economic theory and empirical evidence in that expert testimony and elsewhere in the record indicate that 70 percent of a large number of situations in which a similar monopolist had exclusive deals with the leading distributors were anticompetitive. This finding would make the judge suspicious of the reliability of the findings of the trial court.

How should the appellate court combine the case-specific evidentiary findings of the district court and the category-specific evidence provided by the one judge? What is the appropriate legal rule?

The appellate judge's estimate based on the rejected expert testimony amounts to a base rate that 70 percent of this narrow category of exclusive dealing agreements by monopolists were anticompetitive. This base rate should outweigh the trial judge's finding based on case-specific evidence at trial, because the 70 percent base rate amounts to an anticompetitive presumption that has an error rate of 30 percent whereas the district court's finding based on the case-specific evidence at trial has an error rate of 40 percent. In this sense, the base-rate presumption evidence for this narrow category of conduct is more reliable than the case-specific evidence.

The frequency table in Table 3.3 illustrates this result. The right-hand column shows the base-rate presumption that 70 percent (70 out of 100) of randomly selected cases would involve anticompetitive conduct. The trial court's finding of a 40 percent likelihood of no harm based on case-specific evidence alone amounts to a possible false negative error rate of 40 percent. This 40 percent means that the evidence in 28 of the 70 truly harmful cases would favor the defendant (false negatives). Only 42 of the 70 harmful cases would favor the government (true positives). Among the 30 cases that are actually procompetitive, the evidence in 40 percent of them (12 out of 30) would favor the government, while 60 percent (18 out of 30) would favor the defendant and would not satisfy the standard (i.e., the 12 favoring the government are false positives and 18 favoring the defendant are true negatives).

Table 3.3 Illustration of case of exclusive dealing in which the evidentiary error rate is 40 percent

	Effect of case-specific evidence		
Actual effects	Harmful	Beneficial	Base rate (percent)
Anticompetitive	Number of true positives: 42	Number of false negatives: 28	70
Procompetitive	Number of false positive: 12	Number of true negatives: 18	30
Total	Total number of harmful cases: 54	Total number of beneficial cases: 46	100

Consider the column labelled *Beneficial*, which reports the number of cases in which the case-specific evidence indicates that the conduct is beneficial. This beneficial finding is made in 46 percent of the typical cases, as noted in the row labelled *Total*— that is, reliance on the trial evidence by itself would lead to an overall acquittal rate across all cases of 46 percent. Taking error rates into account, 18 of those acquittals would be consistent with the conduct actually being beneficial rather than harmful (i.e., true negatives), and 28 would be cases in which the conduct was actually anticompetitive (i.e., false negatives). Taking the base rate into account, the proper acquittal rate would be of 39.1 percent (18/46) not 46 percent. For this reason, the appellate court should reverse, as the conduct is actually more likely than not anticompetitive.

This door swings both ways. Suppose that in other cases, the trial judges find on the basis of case-specific evidence that the likelihood that the exclusive dealing was anticompetitive was 60 percent. In this case, the share of such cases would be 54 percent, as shown in the first column of Table 3.3 (Harmful). Of these cases, 78 percent (42/54) would involve actual anticompetitive conduct. This share exceeds the base rate, because the trial evidence reinforces the presumption. Nonetheless, 22 percent of the cases (12 out of 54) would end in erroneous convictions.

The appellate court in this example could respond by announcing that conduct in the narrow category in which the monopolist has exclusive deals with the leading distributors should be subject to an anticompetitive presumption going forward. To rebut that presumption, the defendant would have to provide “clear and convincing” evidence that the conduct is not anticompetitive. The appellate court could indicate that “clear and convincing” evidence amounts to a probability standard of 70+ percent. Alternatively, it could place the burden of proof on the plaintiff but require a showing of only 30+ percent likelihood of harm, a standard that might be called “substantial evidence” of harm.

Suppose the court takes one of these approaches, under the assumption that to prevail, the plaintiff must establish a probability of 30+ percent based on the case-specific evidence. If it does, it is the case that the defendant's exclusive dealing is more likely than not to be anticompetitive after taking account of the base rate presumption evidence as well as the case-specific evidence revealed at trial. If the court finds on the basis of the case-specific evidence alone a 30 percent probability, then the likelihood is 50 percent that the conduct is anticompetitive, based on this evidence and the base rate presumption, as illustrated in Table 3.4.

Table 3.4 Illustration of cases in which the (optimal) evidentiary burden on plaintiff is 30 percent

	Effect of case-specific evidence		
Actual effects	Harmful	Beneficial	Base rate (percent)
Anticompetitive	Number of true positives: 49	Number of false negatives: 21	70
Procompetitive	Number of false positives: 9	Number of true negatives: 21	30
Total	Total number of findings of harmful effects: 58	Total number of findings of beneficial effects: 42	100

This Bayesian analysis applies to other factual assumptions as well. The analysis can also take account of situations in which the magnitudes of the potential harms or benefits are not equal. These asymmetric benefits and costs correspond to different error costs from false positives and false negatives. Suppose, for example, that the welfare harm when the conduct is anticompetitive exceeds the welfare benefit when the conduct is procompetitive or neutral (e.g., potential harms of 150 versus potential benefits of 100). In this situation, the probabilistic evidentiary standard based on case-specific evidence should be skewed even farther in the plaintiff's favor.[83]

If the narrow category of conduct under consideration is generally procompetitive (i.e., the base rate is predominately procompetitive), the analysis would suggest a procompetitive presumption

[83] See, e.g., *In re Winship*, 397 U.S. 358 (1970), where the Court explained: "In a civil suit between two private parties for money damages, for example, we view it as no more serious in general for there to be an erroneous verdict in the defendant's than for there to be an erroneous verdict in the plaintiff's favor. A preponderance of the evidence standard therefore seems peculiarly appropriate."

and an enhanced burden of proof on the plaintiff. If the likely competitive effects of the category of conduct are neutral (i.e., 50 percent each way), there is a neutral presumption would be used. In

this case, placing a more-likely-than-not burden on the plaintiff is optimal.

More plaintiff-friendly standards should thus be applied to categories of conduct that are generally more concerning, in order to reflect the greater presumed concerns.[84] Standards can be made more plaintiff friendly in various ways.

In the real world, the standards of proof for different categories of conduct cannot be set as precisely as they have been in this section, but this technical exercise can point in the right direction. Courts can place a lower burden on the plaintiff by requiring it only to show "appreciable danger" or "reasonable likelihood" of harm, as they do for mergers subject to Section 7.[85] A different lower evidentiary burden might be termed *substantial evidence*. For conduct that is known generally to be substantially less concerning and more likely beneficial, the appellate court could set the legal standard in a way that increases the burden on the plaintiff—by, for example, requiring "a clear showing" or "clear and convincing evidence." It could use similar terms to describe a higher rebuttal burden for the defendant in the rule of reason.

Courts could also find other ways to increase the burden on one side or the other without changing the probability standard. One option would be to retain the more-likely-than-not standard but raise or lower the required evidentiary showing. If the appellate court wished to raise the relative burden on the plaintiff, it could require the plaintiff under the rule of reason to show "disproportionate harm" (relative to benefits) by a preponderance of the evidence (i.e., more-likely-than-not) standard.[86] If it wished to raise the relative burden on the defendant, it could raise the defendant's rebuttal burden by requiring it to show "disproportionate benefits."

This analysis also provides a decision-theory rationale for per se rules. If the anticompetitive presumption is sufficiently strong, the optimal rebuttal burden on the defendant may be so great that it makes more economic sense to make the presumption conclusive and avoid the cost and delays inherent in trials that are very unlikely to change the result. The same point applies to categories of conduct with such a strong procompetitive presumption that it makes sense to apply a rule of per se legality. If, for example, a form of conduct is harmful only 1 percent of the time, an evidentiary standard of at least 99 percent is needed to ensure that the conduct meeting that standard is in fact

[84] Louis Kaplow, *Likelihood Ratio Tests and Legal Decision Rules*, 16 Am. LAW ECON. REV. 1 (2014); Louis Kaplow, *On the Optimal Burden of Proof*, 119 J. POL. ECON. 1104 (2011); Michelle M. Burtis et. al, , 52 SUP. CT. ECON. REV. 1 (2017).

[85] For application of this Bayesian analysis to the structural presumption in *Philadelphia National Bank*, see Steven C. Salop, *The Evolution and Vitality of Merger Presumptions: A Decision-Theoretic Approach*, 80 ANTITRUST L.J. 269 (2015).

[86] For example, Areeda and Hovenkamp have suggested a disproportionate harm standard for Section 2 cases. 3 PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION ¶651a, at 96 (2008).

anticompetitive. As such a high evidentiary standard is unlikely ever to be met, it can make sense to apply a rule of per se legality.

The specific conduct categories to which any of these presumptions are applied should be calibrated on the basis of market facts. Presumptions should be based on a narrow category of conduct, such as exclusive dealing with the leading distributor by a firm with monopoly power or substantial market power, not a more general category, such as all exclusive dealing or all vertical restraints. Per se illegality might be justified for joint pricing that lacks plausible efficiency benefits, not for all joint pricing by competitors or all horizontal restraints. The quick look in horizontal restraint cases was designed to narrow the category of conduct to which the irrebuttable anticompetitive presumption is applied. As a general matter, narrower categories will lead to fewer errors, but they may lack a sufficiently large number of cases to be useful for setting reliable presumptions.

Deterrence Effects

So far the analysis has focused only on avoiding adjudicative errors. Achieving optimal deterrence complicates the analysis. At the most general level, under-deterrence is like a false negative error, and over-deterrence is like a false positive error. Errors must include the impact on deterring conduct that would be procompetitive or anticompetitive.

Treating the base rates as also reflecting deterrence effects complicates the analysis, because the deterrence effects depend on the legal standard. To take an extreme example, privileging a category of conduct will fail to deter anticompetitive uses of that conduct.[87] Because an irrebuttable anticompetitive presumption would deter both procompetitive and anticompetitive conduct, a strict quantitative Bayesian analysis of legal standards would be very complex and require an enormous amount of information, which courts might not be able to assimilate even if it were possible to provide that information. In this sense, Bayesian analysis might be best appreciated for its ability to organize the analysis rather than to identify the optimal rule.

C. Sequencing the Steps of the Decision Process

Breaking up the collection and evaluation of evidence into a sequence of discrete steps has both advantages and disadvantages. To see why, suppose that a substance is toxic if it contains two chemicals, A and B, but is not toxic if it contains only one. If the presence of each chemical is tested separately at a cost, it makes economic sense first to test for the chemical that requires the less expensive test. If, however, one has prior knowledge that chemical A is likely present, it could be smarter to use the more expensive test for chemical B, as the test for A is likely to be positive, which would mean that B would also have to be tested.

If a more expensive test can detect the presence of both chemicals, it may be more economical to use it, depending on its cost and one's prior knowledge about the probability of the presence of each of the chemicals. Suppose, for example, that the likelihood that either chemical is present is 10 percent, the cost of the single-chemical test is $10, and the cost of the combined test is $15. In this example, it

[87] Bruce L. Hay and Kathryn E. Spier, *Burdens of Proof in Civil Litigation: An Economic Perspective*, 26 J. LEG. STUD. 413 (1997).

makes sense to use the single-chemical tests, as the likelihood that a second test will be needed is only 10 percent, leading to an expected testing cost of $11 ($10 plus a 10 percent chance of another $10). If, however, prior knowledge suggests a 70 percent likelihood of the presence of each chemical, then using the combined test (at a cost of $15) is less than the $17 expected cost of the single-chemical test approach.

In antitrust, the issue is typically not the presence of harms and benefits but rather which is greater. Consider first an extreme example in which analysis and experience suggest that the harms almost always exceed benefits for a category of conduct. Suppose, for example, that the harm is $200–$300 and the benefit is $100–$202. In this case, the fact that there is so little overlap (i.e., 200–202) implies that the probability that the defendant's conduct is net beneficial is 1 percent (2/200). As a result, it could make sense to subject this category to a conclusive anticompetitive presumption.

Of course, the result could point in the opposite direction. This same type of analysis can also counsel a rebuttable or conclusive procompetitive presumption, which would apply when benefits typically exceed harms and the cost of identifying contrary outcomes is high.

Consider next a less extreme case. Suppose that the decision maker has prior knowledge based on experience (i.e., a presumption) that the harm is likely to be in $100–$300, with no value more likely than any other, implying an expected value of $200. Suppose the analogous corresponding benefit presumption is $180–$220, with an expected value of $200. If the harm value is less than $180, the harm would be less than the benefit; if it exceeds $220, the harm would exceed the benefits. Benefits can exceed harms only in the middle harm range.

Suppose that sources of evidence of harms and benefits are distinct and that it is equally costly to determine the precise value of either. In this case, it would be less expensive to gather evidence to determine the actual harm value, as there is a very high (80 percent) probability that the value will be either less than $180 or more than $220.[88] Such values would be out of range for benefits and so would eliminate the need to test for benefits. By contrast, if benefits are tested first, it will always be necessary to gather evidence of harm.

This analysis has implications for setting evidentiary standards for both trial and appellate courts in the multi-step structured rule of reason. Consider first the trial court. Suppose that the evidence in Step 1 shows that the harm value is definitively equal to $184. In this case, harm will exceed benefits only if the evidence indicates a benefit of $180–$183.99. As the benefit distribution range is $40 ($180–$220), harm of $184 would exceed benefits with a probability of about 10 percent (4/40). Although this probability is low, trial courts normally would not award summary judgment to the defendant based on it but would allow the plaintiff the opportunity to show that benefits are insufficient.

An appellate court with a focus on structuring the rule of reason based on decision analysis might set a legal standard that does take probabilities into account. Suppose, for example, that economic

[88] The probability that harm is outside the benefit range is 80 percent (160/200).

analysis, empirical studies, and experience indicate that the harm across cases caused by a particular category of conduct would be in the \$100–\$300 range and benefits would be in the \$180–\$220 range. The court could set an evidentiary standard that defines "sufficient evidence" of substantial harm to satisfy Step 1 as a harm value of at least (say) \$190.

Decision analysis also has implications for determining the best sequencing of the steps in the rule of reason inquiry. In the multi-step rule of reason, Step 1 focuses on harm and Step 2 on benefits. This emphasis may not make the most sense for certain categories of conduct. In particular, certain conduct is subject to the "quick-look-to-condemn" standard. Varying the harm and benefits ranges can reveal when this standard is a rational response to market conditions.

Suppose, for example, that for a particular category of conduct, analysis and experience suggest that harms usually exceed benefits. If the harm range is \$200–\$300 and the benefit range \$180–\$220, and both involve uniform distributions, then even if the benefit value is \$220 the harm value will be larger 80 percent of the time; even if the harm value is only \$200 (the lower bound of the range), it will exceed the benefit value 50 percent of the time. For this category of conduct, the appellate court might therefore mandate that the first step of the inquiry should focus on benefits. It might even go farther and require the defendant to satisfy a burden of proof by showing a benefit value of at least \$200. Only if this benefit value can be shown would the burden shift to the plaintiff to make a showing of harm in excess of this benefit value. However, this sequencing may often fail to save any time or expense, because some evidence may be probative for both harms and benefits.