



Summer 6-1-2007

Bias Arbitrage

Amitai Aviram

Follow this and additional works at: <https://scholarlycommons.law.wlu.edu/wlulr>



Part of the [Law and Politics Commons](#), and the [Legislation Commons](#)

Recommended Citation

Amitai Aviram, *Bias Arbitrage*, 64 Wash. & Lee L. Rev. 789 (2007).

Available at: <https://scholarlycommons.law.wlu.edu/wlulr/vol64/iss3/2>

This Article is brought to you for free and open access by the Washington and Lee Law Review at Washington and Lee University School of Law Scholarly Commons. It has been accepted for inclusion in Washington and Lee Law Review by an authorized editor of Washington and Lee University School of Law Scholarly Commons. For more information, please contact christensena@wlu.edu.

Bias Arbitrage

Amitai Aviram*

Abstract

The production of law—including the choice of a law's subject matter, the timing of its enactment and the manner in which it is publicized and perceived by the public—is significantly driven by an extra-legal market in which politicians and private parties compete over the opportunity to engage in bias arbitrage. Bias arbitrage is the extraction of private benefits through actions that identify and mitigate discrepancies between actual risks and the public's perception of the same risks.

Politicians arbitrage these discrepancies by enacting laws that address the misperceived risk and contain a "placebo effect"—a counter-bias that attempts to offset the pre-existing misperception. If successful, politicians are able to take credit for the change in perceived risk, while social welfare is enhanced by the elimination of deadweight loss caused by risk misperception.

However, politicians must compete with private parties such as insurers and the media, who can engage in bias arbitrage using extra-legal means. This Article analyzes methods in which parties engage in bias arbitrage and the effect of interaction between potential bias arbitrageurs on the production of law.

* Associate Professor, University of Illinois College of Law. LL.B. (Tel-Aviv University, 1995); LL.M. (University of Chicago, 2000); J.S.D. (University of Chicago, 2003). I am grateful for invaluable comments I received from Tom Baker, Ehud Brosh, Robert Ellickson, Ehud Guttel, David Hyman, Richard McAdams, Troy Paredes, Jeffrey Rachlinski, and the participants of the Midwestern Law & Economics Association Annual Meeting and of the conference on Behavioral & Experimental Law & Economics hosted jointly by Hebrew University and the University of Haifa. I also wish to thank Patty Liu and John Sholar for their diligent research assistance.

Table of Contents

I. Introduction	790
II. Cognitive Biases Create Fertile Ground for Bias Arbitrage.....	793
III. Government Engages in Bias Arbitrage.....	796
A. Law as a Byproduct of Bias Arbitrage.....	796
B. Standing Above the Biases?	802
C. Social Welfare Effects of Laws with Placebo Effects.....	803
D. Bias Arbitrage and the Literature on Symbolic Legislation	809
IV. Private Parties Engage in Bias Arbitrage.....	813
A. Private Legal Systems.....	813
B. Insurance Providers	815
C. The Media.....	817
V. The Market for Bias Arbitrage.....	821
A. Competition Versus Cooperation of Bias Arbitrageurs	821
B. Artificial Creation of Perception Gaps.....	824
VI. Conclusion: The Future of Bias Arbitrage.....	826

I. Introduction

A significant portion of legal scholarship examines the manner in which law¹ directs behavior.² Law is usually seen as directing behavior by manipulating incentives—either by imposing sanctions to dissuade from certain behavior or by offering benefits to encourage a certain behavior.³

1. Bias arbitrage uses as its vehicle not only legislated acts, but all types of legal actions—legislative, judicial, administrative, and executive. For the sake of simplicity, I use the term "law" throughout the Article to refer to any type of legal action. The implementation of the legal action will be called "enacting the law," and the implementer will be called a "politician."

2. See Richard A. Posner, *Values and Consequences: An Introduction to Economic Analysis of Law*, in CHICAGO LECTURES IN LAW & ECONOMICS 189, 191 (Eric A. Posner, ed., 2000) ("The economic analysis of law . . . tries to explain and predict the behavior of participants in and persons regulated by the law.").

3. See, e.g., Patricia Funk, *Is there an Expressive Function of Law? An Empirical Analysis of Voting Laws with Symbolic Fines*, 9 AM. L. & ECON. REV. 135, 135–36 (2007) ("The classic 'Law & Economics'-approach focuses on deterrence: [A] law enforced by sanctions increases the expected costs of the regulated activity and thereby induces compliance.").

Laws certainly affect individuals' incentives, and through them they direct individuals' behavior. But laws also have an equally important impact on individuals' behavior through a different mechanism—the manipulation of the individuals' perceptions, particularly perceptions regarding the probability and magnitude of risks.⁴ As a result of this effect on perceptions, a law may increase social welfare without having a "real" effect on incentives⁵ simply by causing individuals to think that it does have an effect.⁶ Because of the

4. A "risk," as the term is used in this Article, relates not only to the probability of an event but also to its magnitude. In other words, the disutility to an individual from risk (as the term is used here) may lie not only in the uncertainty itself, but also in the occurrence of the underlying event that is subject to uncertainty. The broad definition of risk is important because, as I will discuss, *infra* Part IV.B, bias arbitrage techniques that affect the perceived magnitude of the underlying event are alternatives to (and compete with) bias arbitrage techniques that affect the perceived probability of the event. Both types of techniques correct gaps between perceived and actual risk.

5. I call a law's effects on incentives "real" because they affect the objective payoffs of individuals, as opposed to effects on perceptions which affect subjective assessments. Both effects cause a "real" (i.e., objective) change in behavior and a "real" impact on social welfare.

6. This effect (a "placebo effect") should not be confused with a phenomenon known as "psychic utility." Psychic utility is a benefit (or harm) that individuals reap from their satisfaction (or dissatisfaction) with the existence of a law. See, e.g., Donald J. Boudreaux, Roger E. Meiners & Todd J. Zywicki, *Talk is Cheap: The Existence Value Fallacy*, 29 ENVTL. L. 765, 768 (1999) (describing existence value as the physiological benefit one experiences from knowing something exists). Psychic utility is entirely subjective. It is caused by manipulation of subjective perception and has purely subjective effects. Conversely, the placebo effect discussed in this paper, though it is caused by manipulation of subjective perception, has objective effects (an increase or decrease in activity related to the risk that is addressed by the law). To illustrate the difference, a person may derive psychic disutility knowing that a racist law repugnant to her exists, even if it is not effective or even enforced. For example, a colonial Massachusetts law enacted in 1675 prohibits Native Americans from entering the city of Boston. See Yvonne Abraham, *Menino Seeks to Repeal 1675 Law Against Native Americans: Symbolic Act Seen as Step Forward*, BOSTON GLOBE, Nov. 25, 2004, at B4 (reporting that Boston Mayor Thomas Menino called the legislature to repeal an unenforced colonial era law prohibiting Native Americans within the city limits). The same law does not create a placebo effect if the person knows that the law is unconstitutional and void because she would know that the law would have no objective effect. Conversely, a law cannot create psychic utility to an individual who does not know about the law, yet the same law can cause a placebo effect, or more precisely, as I will explain in Part III.C, an anti-placebo effect.

superficial similarity to the placebo effect in medicine,⁷ I call this effect of laws on behavior (and on social welfare) the "placebo effect" of the law.⁸

Placebo effects are created when laws are presented in a way that, due to cognitive biases, cause many individuals to either over-estimate or under-estimate the impact of the law on a risk that the law addresses.⁹ Some such biases can be created inadvertently, but often they are created deliberately by politicians who reap personal benefits from the law's manipulation of perceptions.¹⁰ This behavior is a form of "bias arbitrage"—identifying a risk that is either over- or under-estimated by a segment of the public and reaping a private profit from an action that mitigates the discrepancy between the actual and the perceived risk. Though bias arbitrage appeals to the politician's self-interest, even politicians who care for the interest of their constituents rather than their self-interest may find themselves forced to bias arbitrage (by consciously focusing in the short-term on addressing misperceived risks) in order to politically survive long enough to implement long-term policies.¹¹

Enacting laws with placebo effects is only one way to engage in bias arbitrage.¹² Politicians compete with others, such as the media and insurers, who engage in bias arbitrage using methods that do not involve enacting laws.¹³ Politicians' behavior in enacting laws that have placebo effects (as many laws

7. See Raúl de la Fuente-Fernández et al., *Expectation and Dopamine Release: Mechanism of the Placebo Effect in Parkinson's Disease*, 293 SCIENCE 1164, 1164 (2001) (describing the medical placebo effect in treatment of Parkinson's Disease). This is not to say that the process through which medical placebos affect health is similar to the process in which legal placebos affect social welfare. Medical placebos seem to involve physiological processes. Legal placebos simply utilize cognitive biases to manipulate behavior, as I will explain in Part III.C.

8. See Amitai Aviram, *The Placebo Effect of Law: Law's Role in Manipulating Expectations*, 75 GEO. WASH. L. REV. 54, 55 (2006) [hereinafter Aviram, *Placebo Effects*] (arguing that laws have an effect on general welfare by changing the risk expectations of those subject to the law); see also Amitai Aviram, *In Defense of Imperfect Compliance Programs*, 32 FLA. ST. U. L. REV. 763, 773–78 (2005) (applying the placebo effect concept to criminal law leniency policies towards corporations that implement compliance programs).

9. See Aviram, *Placebo Effects*, *supra* note 8, at 62–68 (defining and describing placebo effects of the law).

10. See *id.* at 77–79 ("The people who enact laws (i.e., politicians) harness these biases by shaping both the issues that laws address and the manner in which laws are drafted and presented to the public.").

11. See *infra* Part III.A (elaborating on the incentives of the honest politician to engage in bias arbitrage).

12. See *infra* Part III (discussing how government engages in bias arbitrage).

13. See *infra* Part IV (exploring how nongovernment entities engage in bias arbitrage); *infra* Part IV.A (describing how government and nongovernment entities compete over engaging in bias arbitrage).

do) is better understood in the competitive context in which it operates alongside private players, all of whom struggle to extract private gains from eliminating biases.¹⁴

In Part II of this Article, I survey the forces that create discrepancies between actual and perceived risks which create the opportunity for bias arbitrage. In Part III, I explain how politicians use laws to engage in bias arbitrage. Part IV will examine how nonlegal actors engage in bias arbitrage. In conclusion, Part V will discuss the market that forms from competition (and cooperation) between public and private bias arbitrageurs.

II. Cognitive Biases Create Fertile Ground for Bias Arbitrage

After Hurricane Katrina battered the Gulf Coast in late August 2005 and subsequent levee failures resulted in the flooding of low lying areas in New Orleans, reports from the city and its surroundings portrayed mayhem, best described as surreal.¹⁵ Police officers in Westwego, Louisiana were told that 400 to 500 armed looters were advancing on their town.¹⁶ In the city's Convention Center, SWAT teams were deployed to capture groups of men who were said to have taken over some of the halls.¹⁷ Media reports included "roving bands of armed gang members attacking the helpless, and dozens of bodies being shoved into a freezer at the Convention Center."¹⁸ New Orleans' police chief appeared on television and reported that "little babies [were] getting raped" at the Superdome.¹⁹

The reports above, like numerous others, were unfounded. In all of Louisiana, only four of the 841 recorded hurricane-related deaths were due to gunshot wounds.²⁰ Hurricane Katrina caused a tremendous amount of suffering

14. See *infra* Part V.A (explaining the competition between government and nongovernment entities in exploiting biases).

15. See, e.g., Howard Witt & Michael Martinez, *Thousands Feared Dead in Lawless City*, CHI. TRIB., Sept. 1, 2005, at 1 (describing reports of crime looting and virtual anarchy).

16. See Jim Dwyer & Christopher Drew, *Fear Exceeded Crime's Reality in New Orleans*, N.Y. TIMES, Sept. 29, 2005, at A1 (explaining the effect of rumors on the ability and willingness of police to act).

17. See *id.* (noting several examples of official response to reports of crime in New Orleans following Hurricane Katrina).

18. Susannah Rosenblatt & James Rainey, *Rita's Aftermath: Katrina Takes a Toll on Truth, News Accuracy*, L.A. TIMES, Sept. 27, 2005, at A16.

19. *Id.*

20. See *id.* (contrasting the actual violent crime in the convention center with the exaggerated media reports).

in New Orleans, but the tidal wave of violent crime that was reported in its wake was grossly exaggerated.²¹

Severe misperceptions of risk are not limited to traumatic situations. They are an inevitable result of the human mind's use of heuristics—mental shortcuts that manifest themselves as "gut feelings." Heuristics facilitate immediate analysis of complex information, but like any analytical mechanism, heuristics sometimes fail. Failures that occur in predictable patterns are called cognitive biases.²²

Through observation and experimentation, scholars have identified a number of cognitive biases.²³ For example, a cognitive bias known as the illusion of control is a pattern of over-optimism regarding events whose outcome depends partially on an individual's skill and partially on other circumstances.²⁴ As a result of such a bias an individual may under-estimate the risk to herself from a car accident because of optimism about her driving skills, even though a car accident may occur despite her best efforts due to another's poor driving.

The availability bias is another cognitive pattern by which people "assess the frequency of a class or the probability of an event by the ease with which instances or occurrence can be brought to mind."²⁵ In other words, if we recently encountered, read about, or heard from others of a certain event, we are likely to over-estimate the frequency or probability of that event. The availability bias can be exacerbated by another bias—social amplification, which is the tendency of one's perception of a risk to be influenced by others' perceptions.²⁶ As a result of these two biases, a highly-publicized event such as the hijacking of a plane may cause over-estimation of the probability of hijacking. Such events receive significant media coverage, which brings to the

21. See *id.* (noting several instances of unverified rumors repeated by various news sources that turned out to be false or exaggerated).

22. See John E. Montgomery, *Cognitive Biases and Heuristics in Tort Litigation: A Proposal to Limit Their Effects Without Changing the World*, 85 NEB. L. REV. 15, 16 (2006) (describing cognitive biases and heuristics and their effects on decision making).

23. For discussions of research demonstrating various cognitive biases, see generally, COGNITIVE ILLUSIONS (Rudiger F. Pohl, ed., 2004).

24. See, e.g., Ellen J. Langer, *The Illusion of Control*, 32 J. PERSONALITY & SOC. PSYCHOL. 311, 313 (1975) ("An illusion of control is defined as an expectancy of a personal success probability higher than the objective probability would warrant.").

25. Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCIENCE 1124, 1127 (1974).

26. See Cass R. Sunstein, *The Laws of Fear*, 115 HARV. L. REV. 1119, 1130 (2002) (book review) (using the Three Mile Island incident as an example of an event for which, although no one was injured, the costs were amplified due to distrust of an industry).

mind of each individual an instance of a hijacking (an event that, but for the media, he would probably not be aware of). The "availability" of such an event triggers the availability bias and is likely to cause an increase in the risk perceived by each individual. In addition, because the same media coverage is observed by many individuals, the increase in perceived risk would be exacerbated through social amplification, as one person's heightened concern about airplane hijacking would cause an increase in the same concern by others.

The study of cognitive biases is still in its infancy. Cognitive biases are constantly being identified and refined as more subtle patterns emerge from experiments.²⁷ At this time, a wide range of observed misperceptions is unexplained, or is explained *ex post* as a "just so" story that is not useful for *ex ante* predictions.²⁸ Nonetheless, our understanding of cognitive biases is improving. This Article does not make a contribution to the understanding of cognitive biases, but rather illuminates a process—bias arbitrage—that becomes more feasible (and therefore, presumably, more frequently employed) as cognitive biases are better understood.

How does the study of cognitive biases affect bias arbitrage? In addition to explaining why actual and perceived risks diverge, the research on cognitive biases facilitates bias arbitrage in two ways. First, as our knowledge of biases improves, it is easier to predict when a certain group misperceives a risk.²⁹ It also provides a more accurate estimate of the magnitude of the misperception. This allows potential arbitrageurs to identify the risk that they want to arbitrage. Second, improved understanding of biases can be used (or abused) to take actions that bias people more effectively. As I will explain in the next Part, politicians engage in bias arbitrage by enacting laws that counter-bias the public. Advances in the study of biases may make such counter-biasing more effective and, therefore, increase politicians' desire to engaging in bias arbitrage.

27. See generally *ADVANCES IN BEHAVIORAL ECONOMICS* (Colin F. Camerer, George Loewenstein & Matthew Rabin, eds., 2004) (describing the results of numerous experiments in behavioral economics).

28. *C.f.* Martha Chamallas, *Deepening the Legal Understanding of Bias: On Devaluation and Biased Prototypes*, 74 S. CAL. L. REV., 747, 772–77 (2001) (describing the cognitive bias of devaluation in the context of discrimination based on gender and race without providing an explanation of what creates the bias); Gregory Mandel, *Patently Non-Obvious: Empirical Demonstrations that the Hindsight Bias Renders Patent Decisions Irrational*, 67 OHIO ST. L.J. 1391, 1411–20 (2006) (discussing hindsight bias in the context of patent law but not explaining why different actors have hindsight bias).

29. See William M. Sage, Joshua Graff Zivin, & Nathaniel B. Chase, *Bridging the Relational Regulatory Gap: A Pragmatic Information Policy for Patient Safety and Medical Malpractice*, 59 VAND. L. REV. 1263, 1295 ("Individuals often respond to information about risks such as medical error in predictable ways, based on well-established cognitive biases.").

The discrepancies between a perceived risk and the actual risk caused by cognitive biases create opportunities for extracting private benefits through arbitrage.³⁰ In the next section, I will describe how government uses law as a vehicle to engage in bias arbitrage. Then, in the following section, I will describe how private parties compete with government through their own, extra-legal means of bias arbitrage.

III. Government Engages in Bias Arbitrage

A. Law as a Byproduct of Bias Arbitrage

The enactment, presentation, and enforcement of law affect individuals' perceptions, including their perception of risks. Laws signal to individuals the values of their government and society, knowledge of which may modify the individuals' own values.³¹ In addition, laws affect individuals' expectations about government's behavior. For example, a law that criminalizes speeding creates an expectation that government will attempt to detect and punish speeders, while a law that organizes an airport security agency creates an expectation of lower likelihood that airplanes will be hijacked. Note that the law modifies expectations not only for those parties to whom the law applies (e.g., drivers in the case of the speeding law), but also for parties who are affected by the behavior of those to whom the law applies (e.g., airline passengers, who are affected by the risk of hijacking caused by terrorists which the airport security law aims to deter).³²

30. Cf., e.g., Jon D. Hanson & Douglas A. Kysar, *Taking Behaviorism Seriously: The Problem of Market Manipulation*, 74 N.Y.U. L. REV. 630, 745–49 (1999) (arguing that manufacturers have an incentive to exploit the cognitive biases of consumers); Leandra Lederman & Warren B. Hrungr, *Do Attorney's Do Their Clients Justice? An Empirical Study of Lawyers' Effects on Tax Court Outcomes*, 41 WAKE FOREST L. REV. 1235, 1251 (2006) ("It is also possible that attorneys could exploit clients' cognitive biases for their own ends, which would also be a form of agency cost.").

31. See Matthew D. Adler, *Expressive Theories of Law: A Skeptical Overview*, 148 U. PA. L. REV. 1363, 1364 (2000) (contending that expressive theories of law, in which symbolic laws are meaningful, are not persuasive); Elizabeth S. Anderson & Richard H. Pildes, *Expressive Theories of Law: A General Restatement*, 148 U. PA. L. REV. 1503, 1504 (2000) (claiming that much "of our existing practices of moral and legal evaluation are best understood through expressivist perspectives").

32. This analysis holds true not only for the enactment of new laws, but also for the enforcement of existing laws. Law enforcement affects perceptions, not only of those subject (or potentially subject) to enforcement, but also perceptions of the general public. For example, a Chinese court recently sentenced to death the former head of the Chinese food and drug regulator for taking bribes to approve medicines. Geoff Dyer, *Former Beijing Regulator Given Death Sentence*, FIN. TIMES, May 30, 2007, at 3. An analyst of Chinese politics said that "the

In a world without information asymmetries or cognitive biases, the change caused by a law to the perception of a risk it addresses would be identical to the change in the actual risk. In other words, if a law reduces a given risk by 10%, it would cause a reduction of 10% in the perceived risk. However, both information asymmetries and cognitive biases frequently cause misperceptions of the effects of a law.

Some misperceptions are coincidental, occurring for the same large variety of reasons that cause the public to misperceive risks (as discussed in Part II, above). But other misperceptions are the result of manipulation of cognitive biases by the politicians who sponsor the laws.³³ The politician receives credit (and votes) by creating the perception that the law she sponsored significantly addressed a risk that concerned her constituents. A politician who is better at manipulating public perceptions to over-estimate the benefits of the laws she sponsors will be more successful than her rivals, all things being equal. Such manipulations take many forms, including but not limited to, the way a law is named,³⁴ the way it is presented to the public (e.g., facilitating a tax cut by

sentence was aimed . . . at the domestic audience "They are trying to tell people that the situation is under control and signaling to elements of the bureaucracy to get in line." *Id.* The dramatic enforcement of the law (death sentence) had dual but separate effects on the perception of potential perpetrators, "signaling . . . the bureaucracy to get in line" and "tell[ing] people that the situation is under control." *Id.*

33. Biases may be in some respects more attractive for a politician to exploit than information asymmetries because it may be harder to prove that one presented information in a manner that induced a bias than to prove that one provided false information or failed to provide information. Such difficulties in detection hinder the ability to prohibit or punish intentional exploitation of biases, compared to the exploitation of information asymmetries.

34. In an example that does not seem to involve bias arbitrage, in November 2003, President Bush signed into law an act that changed the name of a swamp from "Congaree Swamp National Monument" to "Congaree National Park." See Pub. L. No. 108-108, tit. I, § 135, 117 Stat. 1241 ("Upon enactment of this Act, the Congaree Swamp National Monument shall be designated Congaree National Park."). Within four months of the name change, and apparently due to it, the number of monthly visitors more than doubled. See Andrew Jacobs, *Park is Still a Swamp, but Please Don't Tell the Tourists*, N.Y. TIMES, Apr. 5, 2004, at A14 (reporting that attendance at the park doubled following the name change).

sending checks to taxpayers),³⁵ or simply by the use of the media to create social amplification of the politician's message.³⁶

For example, suppose that the probability of hijacking an airplane is 0.001% (1-in-100,000), but following the tragic events of September 11, 2001, the public misperceives the risk to be 1%. At a 1% probability of hijacking, few people fly.

Sensing a risk misperception that creates an opportunity for bias arbitrage, a politician sponsors a law to institute airport security. Suppose that the implementation of this law has the effect of reducing the likelihood of hijacking by 50% (to 1-in-200,000). Suppose also that the politician is modest and "undersells" the law, so that the public perceives the law to have no effect. The result is the public still believing that the probability of hijacking is 1% and a continued pattern of few people flying, thus significantly reducing the actual benefits of the law. In such a case, the politician herself receives no credit for her work.

If the politician were not modest, but merely honest, and persuaded the public that the law would reduce hijacking by 50% (as it indeed does), then the public would perceive the probability as 0.5%, still a lethal risk that would deter most air travelers. The politician would receive some credit for her efforts, but because most travelers are still deterred from flying, the credit due the politician would be as limited as the act's effect in increasing air travel.

Suppose, instead, that the politician persuasively overstates the effects of the law, convincing her constituents that the law she sponsored reduces the probability of hijacking by 99%. To a public that expects (prior to the law's implementation) a hijacking probability of 1%, the law's effect would be to reduce the perceived probability to 1-in-10,000. While the public would still over-estimate the likelihood of hijacking by a full order of magnitude, this reduced probability would likely result in a significant increase in air travel. Individuals who are skeptical of the politician's claims (and still believe that the probability is 1%) may refrain from flying, but as they observe others fly, they would notice that far less than 1% of airplanes are hijacked, supporting the

35. The Economic Growth and Tax Relief Reconciliation Act of 2001, Pub. L. No. 107-16, 115 Stat. 38 (codified as amended in scattered sections of 26 U.S.C.), signed into law on June 7, 2001, entitled taxpayers to a rebate of between \$300–\$600. To make the tax cut even more vivid, the Department of Treasury was instructed to mail a check for this rebate to each taxpayer. Press Release, U.S. Dep't of Treasury, *The Check is in the Mail* (July 20, 2001), available at <http://www.treas.gov/press/releases/po495.htm> (last visited Aug. 26, 2007) (on file with the Washington and Lee Law Review). Such vivid, tangible presentation may have made the tax cut's effect on individual taxpayers' finances seem greater than a discussion of aggregate, non-tangible figures.

36. See Aviram, *Placebo Effects*, *supra* note 8, at 76 (noting that media can cause social amplification and therefore the public overestimates a risk).

politician's claim of a probability of 1-in-10,000.³⁷ Thus, even some of the skeptics are likely to eventually credit the law (and the politician who sponsored the law) for the "reduced" risk of hijacking. Beyond the private benefit to the politician, persuasively overstating the law's effects improved social welfare in this hypothetical because the perceived probability of hijacking now more closely approximates the actual probability, resulting in less excessive avoidance of air travel.

This example points out why the opportunity for bias arbitrage affects a politician's choice of what risk to address. Politicians may gain electoral benefit from promoting a law addressing a correctly perceived risk with a solution that actually reduces risk. However, there would be some uncertainty as to whether the solution would work, and even if it did, objective solutions may reduce an actual risk more modestly than cognitive biases inflate perceived risks. In our airplane hijacking hypothetical, the objective solution reduced the probability of hijacking by 50%, so if (counter to the hypothetical's assumptions) the public correctly estimated the risk of hijacking and the law's effects on that risk, the politician would be credited with reducing the risk to 50% of its previous level. Instead, in our hypothetical, the politician is credited with reducing the risk fifty times more, to 1% of its previous level.

Addressing a risk that is correctly perceived would also cause "overselling" the law to have adverse results, both to the politician and to social welfare. If, in our hijacking hypothetical, the actual probability of hijacking was identical to the probability perceived by the public (1%), and the politician successfully persuaded her constituents that the law reduced the probability by 99% (to 1-in-10,000), while it in fact reduced the objective probability by only 50% (to 1-in-200), then the public would fly excessively, unwittingly over-exposing itself to the risk of hijacking. In addition, over time the public will observe that airplanes are hijacked more frequently than 1-in-10,000. When notice of this spreads, the politician will face electoral harm and her credibility will suffer, reducing her ability to receive credit for future laws. Therefore, laws that address risks that are over-estimated are likely to offer higher expected payoffs to the politician and pose less risk from "overselling" than laws that address correctly estimated risks. A rational politician may choose to address an over-estimated risk that has less effective objective solutions over a correctly estimated risk (or an under-estimated risk) that has more effective objective solutions.

37. The actual proportion of hijacked flights would be, per our assumptions, 1-in-200,000.

One does not need to be cynical about politicians' motives to expect them to invoke legal placebo effects by choosing to address risks that are over-estimated and then overselling the laws that they sponsor. A politician who has the public's interests in mind may recognize that she must be responsive to the public's concerns (ill-founded as such concerns may be) or she would not remain in office to implement policies that she believes necessary.

Returning again to the hijacking hypothetical, assume that the public misperceived the 1-in-100,000 probability of hijacking to be 1%. Assume also that no action can immediately prevent future hijackings, but that an effective course of action would take three years to implement. During these three years, the public would continue to believe that the risk of hijacking is much higher than it actually is and refrain from flying. For many people and businesses, a three-year period without air transportation would be highly disruptive. A politician who bluntly claims that her solution would take three years to implement is likely to lose an election to a rival who promises an alternative solution that would immediately reduce the probability of hijacking to 1-in-100,000. Because this is the actual probability of the risk, a law dealing with hijacking need not have any objective effects to "succeed" (though if the law also reduced the actual risk of hijacking—all the better). The well-intentioned politician may use the time bought by this law to implement the three-year solution, which would reduce the actual risk of hijacking to the lowest feasible level.³⁸

Just as well-meaning politicians may intentionally enact laws with placebo effects, so might well-meaning politicians unintentionally create placebo effects by overselling the laws they sponsor. Politicians, like any other person, are susceptible to the illusion of control, which causes over-optimism regarding events whose outcome depends partially on the individual's skill and partially on other circumstances.³⁹ Having applied her skill in identifying and crafting a solution to mitigate a risk, the politician is likely to exhibit over-optimism about the solution's effectiveness.⁴⁰ In addition, facing the task of persuading the

38. Naturally, the private gains to the politician from implementing the three-year plan would be low because the public would no longer be as concerned about hijacking if they correctly perceive the probability to be 1-in-100,000. The reduced pressure from the public and resulting reduction in implementation of objective solutions to the risk is not necessarily lamentable. If the public is over-estimating the risk, then the pressure it puts on the politicians is excessive.

39. See Langer, *supra* note 24, at 313 ("An illusion of control is defined as expectancy of a personal success probability higher than the objective probability would warrant.")

40. See, e.g., Amitai Aviram & Avishalom Tor, *Overcoming Impediments to Information Sharing*, 55 ALA. L. REV. 231, 254–57 (2004) (noting that when outcomes depend on a mixture of skill and chance, decision makers are likely to overestimate their ability to control chance

public of the law's expected effects, even the honest politician may fall prey to a self-serving bias and genuinely over-estimate the law's positive effects.⁴¹

Thus, politicians engage in bias arbitrage, sometimes intentionally, for either self-serving or altruistic purposes, and sometime unwittingly, due to biased over-estimation of the effects of a law they devise and sponsor. To the politician engaging in bias arbitrage, the law is a vehicle through which placebo effects are administered (just as a sugar pill is the vehicle through which a medical placebo is administered).

Bias arbitrage is a form of counter-biasing, not debiasing.⁴² In other words, it does not address and eliminate the bias that created the risk misperception.⁴³ Rather, it creates a new bias that is aimed to offset the original bias. Because the causes of the original bias are not addressed and because counter-biasing may overcorrect, or conversely, fail to fully offset the original bias, from a social welfare perspective bias arbitrage is a second best solution. In ideal conditions, debiasing would be preferable. However, debiasing is often costly, impractical, and less likely to be employed because it frequently lacks the private incentives that bias arbitrage offers to those that engage in it.⁴⁴

Law serves as a means to bias arbitrage, and so does the risk that the law addresses. A politician must select on which issue (or, differently put, which risk) to focus. Several considerations may influence her decision, but one of the most powerful considerations—largely ignored by the literature—would be the risk's potential for arbitrage (i.e., the existence of a perception gap—a discrepancy between the actual and perceived risk). Indeed, if they do not readily find a suitable risk, politicians may venture to generate a perception gap in a correctly perceived risk in order to create opportunity for bias arbitrage.⁴⁵ By identifying an over-estimated risk and conspicuously sponsoring legislation or law enforcement that addresses the risk, the politician can claim credit for

events).

41. One form of self-serving bias affects predictions (i.e., that an individual believes that a desired outcome is more likely to occur than an undesirable outcome). See, e.g., Linda Babcock et al., *Biased Judgments of Fairness in Bargaining*, 85 AM. ECON. REV. 1337, 1341 (1995) (finding that a self-serving estimate of fairness affected predictions of a hypothetical judge's award).

42. On the use of law to debias, see Christine Jolls & Cass Sunstein, *Debiasing Through Law*, 35 J. LEG. STUD. 199, 200 (2006).

43. See *id.* (defining debiasing through the law as when legal policy acts "directly on the boundedly rational and attempts to help people to either reduce or eliminate" problems as opposed to merely insulating them from negative outcomes).

44. See Jeffrey J. Rachlinski, *Cognitive Errors, Individual Differences, and Paternalism*, 73 U. CHI. L. REV. 207, 221 (2006) (describing costs of debiasing).

45. See *infra* Part V.B (discussing methods by which politicians create opportunity for bias arbitrage).

more than the law's objective effect on the risk, without ever losing credibility for that claim. Because it does not erode a politician's credibility, bias arbitrage is unlike other forms of politicians' "puffery."⁴⁶

B. *Standing Above the Biases?*

The bias arbitrageur identifies risk misperceptions caused by biases. But why is she not blinded by those same biases?

Bias arbitrage is possible despite an arbitrageur's susceptibility to biases. Individuals vary in their susceptibility to cognitive biases (or, put differently, in their ability to debias themselves).⁴⁷ Bias arbitrage is typically a more certain and less costly way for a politician to create a perception of effectiveness than addressing a correctly perceived risk. Politicians who are able to effectively engage in bias arbitrage would be, *ceteris paribus*, more successful than their rivals and, through competition, would more likely survive in politics. The average surviving politician is likely to have better than average ability to debias herself in perceiving risks in the areas in which she focuses her political activity.

The politician does not have to be less susceptible to all biases in order to be an effective bias arbitrageur. Politicians specialize, and become known for activity in certain areas (e.g., expertise in defense, foreign relations, government ethics/campaign finance, economic policy, etc.). If a politician has a superior ability to debias her risk perception in a certain area (e.g., correctly perceive the risk of war), she can engage in bias arbitrage in that area, even if she is prone to biases in other areas (e.g., prone to biases causing her to overestimate the prevalence and severity of corporate fraud), which would preclude her from engaging in bias arbitrage in these other areas. A politician's good judgment in her area of specialization includes not only her knowledge, but also her resistance to the biases that most affect that area. The latter affects her ability to engage in bias arbitrage.

46. If a politician "oversold" the effectiveness of a law addressing a correctly perceived risk, people would eventually notice that the risk is greater than the politician claimed and the politician's credibility would ultimately suffer.

47. See, e.g., Chris Guthrie & Jeffrey J. Rachlinski, *Insurers, Illusions of Judgment and Litigation*, 59 VAND. L. REV. 2017, 2047 (2006) (suggesting that insurance claim adjusters are less susceptible to some cognitive biases than the general population); Rachlinski, *supra* note 44, at 216–24 (explaining factors leading to variance in susceptibility to cognitive biases). For the purposes of this Article, I use "resistance to/susceptibility to cognitive bias" and "ability to self-debias" interchangeably.

The politician need not know the areas in which she has better resistance to biases. Experience will teach her in which areas she misjudged risk, and competition between politicians would force her to reposition herself as active in another area of political debate, or lose prominence to rivals who have superior debiasing abilities regarding these risks.

Even bias-resistant politicians are not wholly unbiased. Yet despite facing some probability of misidentifying a perception gap (and therefore launching a failed attempt to bias arbitrage), they are likely to attempt arbitrage. Politicians are entrepreneurs and advance their careers by identifying issues that the public—or interest groups within it—wants addressed and remedying them. Like all entrepreneurs, they face a risk of failure, either because they identified the wrong issue, or because they advanced the wrong remedy. The risk of failure in itself does not determine whether bias arbitrage takes place. Rather, it is the relative risk of failure from engaging in bias arbitrage compared to the risk of failure from pursuing an issue that seems more correctly perceived by the public. As long as bias arbitrage offers politicians the possibility of receiving "free credit" for a reduction in an over-estimated risk, politicians are likely to attempt it, despite the risk of failure caused by their own susceptibility to biases. Through an evolutionary process of competition, the less bias-susceptible of these entrepreneurs are likely to prevail.

C. *Social Welfare Effects of Laws with Placebo Effects*

Bias arbitrage creates private benefits to the arbitrageur but also impacts the public's perception gap (the discrepancy between the actual and perceived risk) and thus affects social welfare.⁴⁸ I now turn to discuss when placebo effects are laudable for enhancing social welfare and when they are lamentable because they reduce social welfare.

Individuals respond to risk in two ways: avoiding the risk, or, if avoidance is not feasible, expending resources to confront the risk.⁴⁹ Recall the example of the excessive perception of crime in New Orleans following Hurricane Katrina.⁵⁰ Responding to a perceived dramatic increase in crime, some police officers in New Orleans and its surroundings resigned to avoid exposure to the

48. See Aviram, *Placebo Effects*, *supra* note 8, at 92 (noting that placebo effects, which are one method to extract private benefits from perception gaps, can have both positive and negative effects on social welfare).

49. See *id.* at 66–67 (describing risk avoidance and mitigation of investors in the context of a law to punish corporate fraud).

50. See *supra* Part II.

risk.⁵¹ Meanwhile, some of New Orleans' residents brandished guns and patrolled their property, thereby confronting the risk.⁵²

Both activity avoidance and confrontation are costly, though either may be efficient if it is the least costly method for avoiding more costly harm from the risk. Absent information asymmetry and cognitive biases, an individual's decision to avoid or confront a risk should be efficient from the perspective of social welfare.⁵³ However, as we have seen in the New Orleans example, cognitive biases cause misperceptions of risk. When perceived risk exceeds actual risk, individuals excessively avoid or confront the risk, imposing unnecessary costs on themselves and others.⁵⁴ When perceived risk is lower than actual risk, individuals insufficiently avoid or confront the risk, imposing on themselves or others the cost of a higher probability of harm.

Looking to the airplane hijacking hypothetical,⁵⁵ if the objective probability of a hijacking is 1-in-100,000, but the public perceives the probability as 1%, then most individuals would avoid flying, either staying put and losing the benefit of reaching their intended destination, or substituting another method of transportation and bearing the higher actual risk of accidents.⁵⁶ On the other hand, if the actual probability of hijacking was 1%,

51. See Dwyer & Drew, *supra* note 16, at A1 (describing how exaggerated rumors of crime affected police response in the aftermath of Hurricane Katrina).

52. See Felicity Barringer & Jere Longman, *Owners Take Up Arms as Looters Press Their Advantage*, N.Y. TIMES, Sept. 1, 2005, at A16 ("Many people with property brought out their own shotguns and sidearms.").

53. An implicit assumption in this statement is that that any externalities of the decision whether to avoid or confront the risk are internalized. For example, the decision of a police officer to resign has externalities on the welfare of the population that lives in the area in which the officer serves. This externality existed before a crisis formed and was internalized through payment of a salary to the officer. Changes in the perceived risk may destabilize internalization mechanisms (e.g., a police officer's salary would no longer compensate for the officer's heightened perceived risk), though internalization mechanisms can and often are designed with this eventuality in mind (e.g., severe sanctions for soldiers refusing orders during battle; hazardous duty bonuses, etc.).

54. Risk confrontation may internalize costs on others just as risk avoidance does. For example, heightened perception of risk of crime in New Orleans may cause a property owner who is patrolling his property to misperceive another's actions as hostile and attack that person. As with externalities of risk avoidance, there are internalization mechanisms (e.g., criminal law, tort law), and as with risk avoidance, these mechanisms sometimes become destabilized due to changes in perceived risk.

55. See *supra* Part III.A.

56. Automobile transportation is generally considered riskier than air transportation. See, e.g., Garrick Blalock, Vrinda Kadiyali & Daniel H. Simon, *The Impact of 9/11 on Road Fatalities: The Other Lives Lost to Terrorism 1* (Feb. 10, 2005) (unpublished working paper, on file with the Washington and Lee Law Review), available at <http://www.news.cornell.edu/stories/March05/Sept11driving.pdf> (claiming that at least 1,200 additional driving

but cognitive biases caused the population to perceive the probability as 1-in-100,000, then too many people would fly and be hijacked.

The loss of social welfare, from excessive or insufficient risk avoidance or confrontation, increases as the gap between actual and perceived risk grows. Placebo effects may mitigate, or exacerbate, this gap. A placebo effect is a product of cognitive bias and information asymmetry, which causes an individual to perceive the effect of a law on a risk differently from the actual effect of the law.⁵⁷ The law, therefore, serves as a vehicle that introduces change to the actual risk, the perceived risk, or both, affecting the gap between actual and perceived risk.

Over time, people can debias themselves without the aid of a placebo effect as they track the occurrence of the risk and adjust their perceptions to what they observe. However, placebo effects speed the process and, therefore, reduce the amount of time during which the misperception of a risk causes a reduction in social welfare.

The direction of the placebo effect, relative to the direction of the bias, determines whether the placebo effect has a positive or negative impact on social welfare. If the placebo effect applies in the same direction as the risk misperception that existed prior to enacting the law, then the placebo effect exacerbates the gap between perceived and actual risk and will reduce social welfare.⁵⁸ For example, suppose that the public under-estimates the risk posed by traffic accidents (say, the actual probability is 1%, but the perceived probability is 0.8%), and government enacts a law that mandates implementation of safety features in cars. Suppose also that the law reduces the actual probability of car accidents by 10% (to 0.9%), but the politician who sponsors the law "oversells" it and causes the public to expect the probability to drop by 50%, making perceived probability 0.4%. Despite the reduction in the actual probability, the gap between actual and perceived probabilities has widened from 0.2% to 0.5%. As a result, safety precautions in driving (and avoiding driving), which were already insufficient prior to the law, will be even less sufficient after enacting the law. The reduction of 0.1% in the probability of car accidents will have a positive effect on social welfare, but the placebo effect—that is the reduction in safety precautions that results from more than

deaths are attributable to the September 11th attacks because the attacks caused individuals to switch their travel plans from flying to driving).

57. See Aviram, *Placebo Effects*, *supra* note 8, at 70 ("The placebo effect of law mitigates the discrepancy between actual and perceived probabilities and thus captures some of the social welfare lost because of this discrepancy.").

58. See *id.* at 93 (describing how negative placebo effects reduce social welfare).

doubling the gap between the actual and perceived probabilities of car accidents—will reduce social welfare.⁵⁹

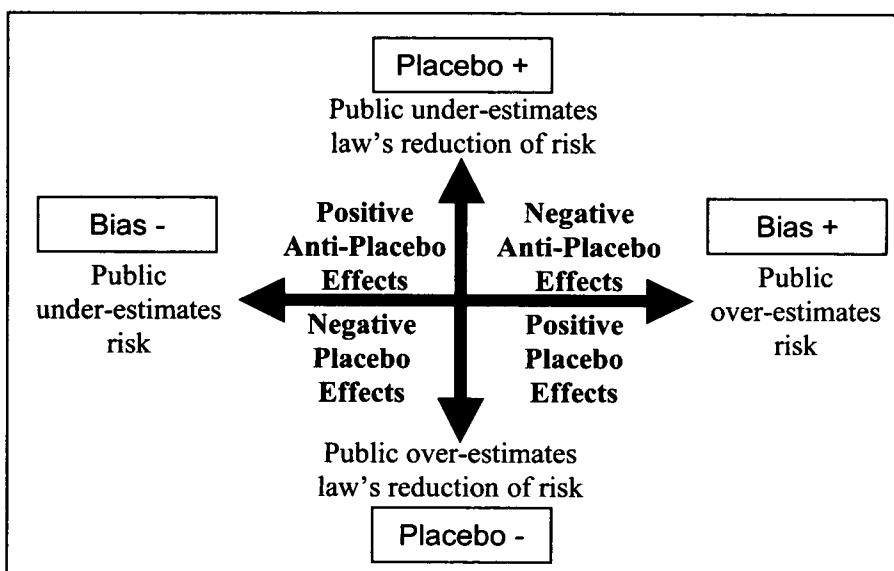
On the other hand, if the placebo effect applies in the opposite direction from the risk misperception that existed prior to enacting the law, then the placebo effect mitigates the gap between perceived and actual risk and will increase social welfare.⁶⁰ Returning to our example of airplane hijacking, assume that the public over-estimates the risk posed from hijacking, the probability of which is actually 1-in-100,000, but is perceived to be 1%. Assume also that a politician sponsors a law that reduces the actual probability by 50% but is perceived by the public to reduce the probability by 99%.⁶¹ After enacting the law, the actual probability is 0.0005%, while the perceived probability is 0.01%. Prior to the law, the gap had been 0.999%; after enacting the law, the gap has narrowed to 0.0095%. As a result, avoidance of flying, which had been very excessive, is less excessive now. This utility accumulates with the benefits of reducing the actual probability of hijacking. Both increase social welfare.

59. This effect may seem like a form of moral hazard, but it is not. I explain in detail the difference between this effect (called negative placebo effect) and moral hazard in Aviram, *Placebo Effects*, *supra* note 8, at Part V.B. Because this Article focuses on bias arbitrage rather than legal placebo effects, I will not address this issue here.

60. There is an exception to this statement, when the misperception caused by the law "overshoots" the prior misperception. For example, suppose that prior to enacting a law, the public only moderately misperceived the risk of hijacking (e.g., perceived it to be 1-in-75,000 when it was actually 1-in-100,000). Suppose also that the law reduced the objective probability by 50%, but the public was persuaded that the risk was reduced by 99% (so the objective probability is 1-in-200,000, and the perceived probability is 1-in-7,500,000). Prior to enacting the law, there was an over-estimation gap of approximately 0.00033%; now there is an under-estimation gap of 0.00048%. Thus, the public is more over-optimistic about the risk after the law, than it was over-pessimistic about the risk prior to the law. If risk avoidance and confrontation expenditures are symmetrical for over-optimism and over-pessimism, then we expect a greater cost from insufficient avoidance/confrontation after enacting the law than the cost from excessive avoidance/confrontation prior to enacting the law. This pattern of "overshooting" is likely to be relatively rare, however, because (as explained in Part III.A) politicians have a strong incentive to sponsor laws addressing risks that are grossly misperceived, and overshooting is unlikely to happen when the original misperception is severe.

61. To be clear, "overselling" a law means that in absolute terms, the law reduces the perceived risk probability more than the actual risk probability. Thus, a law may be "oversold" even if (unlike in this example) the claimed percentage of risk reduction (in this example, 99%) is smaller than the actual percent of risk reduction (in this example, 50%), as long as in absolute terms the claimed risk reduction is greater than the actual risk reduction. Applied to the above example, if the law reduced the objective probability by 50% (to 0.0005%, a reduction of 0.0005%), but the politician only claimed the law would reduce the risk by 40% (to 0.6%, a reduction of 0.4%), she would still oversell the law, since in absolute terms the law reduced the perceived risk by 0.4% and the actual risk by only 0.0005%. When a risk is extremely over-estimated, the change in the actual risk may barely affect the change in the perception gap because even small changes in the (much larger) perceived risk will be greater in magnitude.

As these examples demonstrate, there is more than one type of placebo effect. In fact, there are four types, divided by two criteria: (i) the pre-existing bias—whether prior to enacting the law, the public over- or under-estimated the risk later addressed by the law; and (ii) the placebo's impact on risk perception—whether the public over- or under-estimated the effect of the law in reducing the risk.⁶² The four types of placebo effects are presented in the following figure:



The hijacking hypothetical falls into the category of "positive placebo effects."⁶³ The public over-estimated the risk of hijacking prior to the law's enactment, and over-estimated the effect of the law in reducing the same risk. As explained above, the misperception caused by the law runs counter to the misperception that existed prior to the law. As a result, the gap between actual and perceived risk was reduced, and social welfare increased.

The car accident hypothetical falls into the category of "negative placebo effects." The public under-estimated the risk of car accidents prior to the law's enactment, and over-estimated the effect of the law in reducing the same risk. As explained above, the misperception caused by the law was in the same

62. For a more detailed analysis of the types of placebo effects see Aviram, *Placebo Effect*, *supra* note 8, at 92–102.

63. The use of "positive" and "negative" in classifying placebo effects refers to their impact on social welfare.

direction as the misperception that existed prior to the law. Therefore the law exacerbated the misperception, reducing social welfare. One expects negative placebo effects to be less common than their positive counterparts because politicians have less to gain from addressing risks that are under-estimated. The over-optimistic public would be less concerned with the risk, making it less attractive for the politician to address. If the risk is addressed by a law and the politician manages to "oversell" the law's effects, it will widen the gap between the law's actual effects and its perceived effects. Over time, this gap will likely be noticed, and the politician's credibility would suffer.⁶⁴

The other two effects are a result of a misperception that under-estimates the law's effect in reducing the risk it addresses. I call them anti-placebo effects because they are akin to a perverse experiment in which a patient is told that she is taking poison rather than medicine, though objectively the pill she takes is benevolent or benign. If normal placebo experiments demonstrate a positive effect on the patient's health merely by her thinking that she is taking medicine, one would expect the opposite, negative effect on the patient's health if she thought she is taking a harmful substance. Of course, this is why such experiments are not done in the realm of medicine.

It may not be obvious at first blush that anti-placebo effects play a role in the legal realm. Why would the public under-estimate a law's effect in dealing with the risk it was designed to address? Politicians have the incentive to take credit for their initiatives, and successful politicians are likely to have skill in persuading the public of the effectiveness of their initiatives. Furthermore, due to their own cognitive biases, politicians are likely to genuinely over-estimate the effectiveness of their laws.

However, in some circumstances, the effectiveness of laws is underestimated, and laws may even be perceived to increase certain risks.⁶⁵ This may occur when politicians must make a trade-off between the interests of several groups. They may benefit one group (or reduce a risk that concerns it) at the cost of increasing a risk to another group. For example, government may attempt to use eminent domain to solve hold-out problems and facilitate economic development. The purpose of the law is to address economic stagnation or decline. To others who perceive their property as similarly

64. In the car accident example, the public will expect a 0.4% probability of car accidents because of the politician's promise that the law will reduce accidents by 50%. Over time, as the public gradually observes that the actual rate of car accidents is 0.9% (higher than the perceived probability prior to enacting the law), the politician's credibility would be put to question, and the law may be (wrongly) perceived to have increased the actual risk of car accidents.

65. See Aviram, *Placebo Effects*, *supra* note 8, at 98–102 (discussing the "anti-placebo effects" of laws that increase perceived risks).

situated, however, the law may also increase the perceived risk of future confiscation. If the effects of government's action on each of these risks are misperceived, those individuals who are concerned about their community's economic decline may experience a placebo effect,⁶⁶ while those who are concerned about their property's vulnerability to confiscation may experience an anti-placebo effect.⁶⁷

Anti-placebo effects may also occur in situations in which a segment of the population is ignorant of a law, and therefore, the law does not affect this segment's perceived risk, though it does affect the actual risk. If such a law reduces the actual risk, then it creates an anti-placebo effect because its effects were under-estimated—the individuals ignorant of the law perceived an effect of zero, while the law had in fact reduced the actual risk.⁶⁸

Finally, an effect similar to an anti-placebo effect occurs when parties who are interested in engaging in bias arbitrage attempt to create or expand a gap between perceived and actual risk, which they could later exploit. These parties may act in ways that increase the perception of risk, while (unlike the bias arbitrage process) trying not to have the increase in risk perception be attributable to them. I will discuss this type of behavior in Part V.B below.

D. Bias Arbitrage and the Literature on Symbolic Legislation

As explained above, law is a vehicle for politicians to engage in bias arbitrage. In Part IV of this Article, I will discuss extra-legal methods of bias arbitrage that may compete with law. Before moving to address these extra-legal methods, a few words are necessary to describe the relationship between the concept of bias arbitrage, which uses law to create placebo effects, and the concept of symbolic legislation.

Scholars have long ago noted that law has, beyond its effects on individuals' incentives, communicative and expressive functions.⁶⁹ For example, Wibren Van Der Burg described the communicative function of law

66. Whether this would be a positive or negative placebo effect depends on the misperception (if any) of the risk prior to government's action.

67. Some people may be concerned with both risks, and therefore be affected by both a placebo and an anti-placebo effect, each addressing a different risk.

68. For further development of this idea, see Amitai Aviram, *The Hidden Effect of Ignorance of the Law* (Aug. 2007) (unpublished manuscript, on file with author).

69. See generally MURRAY EDELMAN, *THE SYMBOLIC USES OF POLITICS* (1964); ERIC A. POSNER, *LAW AND SOCIAL NORMS* (2000); Robert C. Ellickson, *The Market for Social Norms*, 3 *AM. L. & ECON. REV.* 1 (2001); Richard McAdams, *The Origin, Development and Regulation of Norms*, 96 *MICH. L. REV.* 338 (1997).

as providing a framework of standards for citizens to interpret and live up to, and the expressive function as embodying the "shared values which are connected with the identity of a political community."⁷⁰ More closely related with the concept of bias arbitrage, some scholars noted the role of law in providing assurance through the use of symbols.⁷¹ The study of symbolism in politics was pioneered by Murray Edelman, who argued that a principal function of many forms of political participation is to provide symbolic reassurance to the public.⁷² The law functions "as symbolizing the public affirmation of social ideals and norms as well as a means of direct social control" that could influence behavior unrelated to law's enforcement function.⁷³ Applied to legislation, "symbolic legislation serves the needs of the public by indicating that Congress is 'doing something' about a perceived problem"⁷⁴ In other words, symbolic legislation is unconcerned with enforcement because in "analyzing law as symbolic we are oriented less to behavioral consequences as a means to a fixed end; more to meaning as an act, a decision, a gesture important in itself."⁷⁵

Some legal scholars drew on the concept of symbolic legislation, particularly in tax and environmental law.⁷⁶ Though the literature recognized

70. Wibren Van Der Burg, *The Expressive and Communicative Functions of Law, Especially with Regard to Moral Issues*, 20 L. & PHIL. 31, 39–41 (2001).

71. See Helgi Gunnlaugsson & John F. Galliher, *Prohibition of Beer in Iceland: An International Test of Symbolic Politics*, 20 LAW & SOC'Y REV. 335, 336 (1986) (describing how unenforceable antitrust legislation serves the instrumental purpose of "reassuring an angry public that past abuses of business leaders were no longer possible" while also serving a symbolic function).

72. See EDELMAN, *supra* note 69, at 4 ("Not only does systematic research suggest that the most cherished forms of popular participation in government are largely symbolic, but also that many of the public programs universally taught and believed to benefit a mass public in fact benefit relatively small groups.").

73. Joseph R. Gusfield, *Moral Passage: The Symbolic Process in Public Designations of Deviance*, 15 SOC. PROBS. 175, 177 (1967).

74. Michael S. Kirsch, *Alternative Sanctions and the Federal Tax Law: Symbols, Shaming, and Social Norm Management as a Substitute for Effective Tax Policy*, 89 IOWA L. REV. 863, 921 (2004).

75. Gusfield, *supra* note 73, at 177.

76. See, e.g., John P. Dwyer, *The Pathology of Symbolic Legislation*, 17 ECOLOGY L.Q. 233, 234 (1990) ("The most significant problem with symbolic legislation, however, is not delay; it is the resulting distortions in the regulatory process."); Steve R. Johnson, *The Dangers of Symbolic Legislation: Perceptions and Realities of the New Burden-of-Proof Rules*, 84 IOWA L. REV. 413, 446–58 (1999) (noting, using the tax context as an example, that symbolic legislation, though devoid of meaning, may be politically expedient or even necessary); Michael S. Kirsch, *The Congressional Response to Corporate Expatriations: The Tension Between Symbols and Substance in the Taxation of Multinational Corporations*, 24 VA. TAX REV. 475, 507–16 (2005) (discussing the symbolic effect of Congress' response to corporate

the assurances that many laws provided to the public, it failed to recognize the potential positive impact on social welfare. Most of the scholarship on symbolic legislation treats it as a smoke screen that distracts the public and displaces legislation that could enhance social welfare. One scholar apocalyptically wrote: "The enactment of symbolic legislation reflects a breakdown of the legislative policymaking machinery, a system that all too frequently addresses real social problems in an unrealistic fashion."⁷⁷ Under this view, symbolic legislation at the "societal macro-level" is "societal self-deception and an instrument for *managing* rather than *resolving* . . . problems" while on the "micro-level" as a "self-deception of individuals who are psychologically divided between supporting meaningful . . . policies and worrying about the costs which such policies might entail."⁷⁸

While there can be abuse through the manipulation of perceived risk, an issue addressed in Part V.B, bias arbitrage is no more susceptible to abuse than any other governmental action. Though imperfect, the same mechanisms that mitigate other governmental abuses also limit the ability of politicians to solely engage in bias arbitrage. More importantly, the legal scholarship on symbolic legislation fails to note the actual, welfare-enhancing impact that bias arbitrage has in situations in which the public over-estimates a risk. They examine only what a law's assurance does to individuals' political behavior, not what the assurance does to individuals' behavior regarding the risk that they face.

Returning to the hijacking hypothetical, passage of the Aviation and Transportation Security Act (ATSA)⁷⁹ would provide assurance in response to the public's excessive avoidance of flying after September 11, 2001. Due to the reduced perception of the risk, the public would indeed put less pressure on politicians to further expend resources on aviation safety. However, the public would also substitute their travel plans back to airplanes and away from cars (a method of travel which objectively has a higher risk of injury), resulting in

expatriations); John W. Lee & W. Eugene Seago, *Policy Entrepreneurship, Public Choice, and Symbolic Reform Analysis of Section 198, The Brownfields Tax Incentive: Carrot or Stick or Just Never Mind?*, 26 WM. & MARY ENVTL. L. & POL'Y REV. 613, 620–21 (2002) (arguing that limitations imposed on the Clinton Administration's brownfields tax incentive rendered it largely symbolic).

77. Dwyer, *supra* note 76, at 234; *see also* Lee & Seago, *supra* note 76, at 620 ("Political science literature utilizes 'symbolism' to mean demonizing 'political enemies' in political discourse, which tends to deflect those seeking substantive reform.").

78. Jens Newig, *Symbolic Environmental Legislation and Societal Self-Deception*, 16 ENVTL. POL. 276, 277 (2007).

79. *See* Aviation and Transportation Security Act, Pub. L. No. 107-71, 115 Stat. 597 (codified in scattered sections of 49 U.S.C.) (creating the federal Transportation Security Administration, which is responsible for security in U.S. airports).

safer travel.⁸⁰ Furthermore, if people over-estimate a risk, then the pressure they put on politicians to enact laws responding to those risks is itself excessive. If bias arbitrage causes the perceived risk to more closely approximate the actual risk, then the public's pressure on politicians to address the risk would be at a more appropriate intensity.

A charitable view of the literature that is critical of symbolic legislation would be that it implicitly assumes the risk perceived by the public is no higher than the actual risk. If the public correctly estimates the risk or under-estimates it, then a law that assures the public would exacerbate the public's unwarranted optimism and prevent political pressure to further address the risk.⁸¹ Worse, the assurance will cause the public to take insufficient precautions against the risk.⁸² Such laws would have negative placebo effects that indeed reduce social welfare.⁸³

The literature that is hostile to symbolic legislation does not, however, make this assumption explicit or attempt to support it. There are reasons to suspect that for many laws this assumption would be false. Politicians are less likely to enact a law in an area in which the public under-estimates a risk because such a law would not address most voters' greatest concerns and would forgo the benefit to the politician from bias arbitrage. To appear effective and enhance the prospects of reelection, a politician needs to address those risks that most concern her constituents. A risk is unlikely to be under-estimated by the constituents and at the same time be of great concern to them.

If, contrary to the implicit but unlikely assumption stated above, the risk that concerns the public is indeed over-estimated, then bias arbitrage would both positively affect the public's level of risk avoidance and confrontation, and the public's level of political pressure to address the risk. Thus, much of the hostility in the literature on symbolic legislation is unwarranted. Politicians' own incentives often direct them to focus on symbolic legislation in circumstances in which it is helpful, rather than harmful, to reduce the public's perception of a risk.

80. On the effects of substituting ground transportation for air transportation, see Blalock et al., *supra* note 56, at 10.

81. See Newig, *supra* note 78, at 286 (describing a German traffic law that resulted in no reduction of ozone levels while turning public attention away from summer smog issues).

82. See Aviram, *Placebo Effects*, *supra* note 8, at 93 (noting that exacerbation of unwarranted optimism will remove incentives to sufficiently avoid risks).

83. See *id.* ("Negative placebo effects reduce social welfare because they make the public expose itself unnecessarily to risks (i.e. sufficiently avoid activities related to a risk).").

IV. Private Parties Engage in Bias Arbitrage

A. Private Legal Systems

Private legal systems (PLSs)—nongovernmental social institutions that enforce norms—engage in bias arbitration in the same manner as government does, by identifying misperceived risks and then forming and enforcing norms that are designed to address the misperceived risks.⁸⁴ These norms are then presented in a manner that attempts to cause an overestimation of the norm's effect on the risk. If successful, the PLS receives credit for the reduction in the perceived risk, while social welfare is enhanced by the convergence of actual and perceived risks.

In the case of government, adherence to enforced norms (i.e., laws) is mandatory and backed with government's monopoly on violence, but individual politicians are not secure in positions of power, and must solicit the constituents' favor (a solicitation which may be less costly when engaging in bias arbitration).⁸⁵ Thus, bias arbitration is used by government not to maintain support for its existence, but to maintain support for the individual politicians who direct the government's actions.

In contrast, PLSs have no assurance of their existence. Adherence to norms enforced by a PLS is voluntary and depends on the utility constituents derive from the norm. Such utility includes carrots (benefits provided by the PLS, such as the perceived utility to constituents from the norm being enforced) and sticks (perceived harm inflicted on constituents expelled from the PLS).⁸⁶ Both the perceived benefit from norm enforcement and the perceived harm from expulsion depend on the perceived risk that is to be mitigated by the norm being enforced by the PLS. Successful bias arbitration allows the PLS to receive

84. See Amitai Aviram, *A Paradox of Spontaneous Formation: The Evolution of Private Legal Systems*, 22 *YALE L. & POL'Y REV.* 1, 5 (2004) (defining PLSs as "institutions that form and enforce norms. They either replace or complement an extant public legal system ('the law')").

85. In democratic governments, politicians are elected (or, in some positions, appointed by elected officials) and therefore need to explicitly receive the public's approval. However, bias arbitration is important in nondemocratic governments as well; even a dictator would find it much less costly to maintain his hold on power with some carrots (e.g., protecting his subjects from risks that they perceive as significant) in addition to sticks (e.g., risk of imprisonment or execution). Indeed, many dictators rally their subjects around protection from the often exaggerated threat of foes. Dictators differ from their democratic counterparts, however, in their ability to suppress competition with private bias arbitrageurs. See *infra* Part IV.A.

86. Cf. Amitai Aviram, *Regulation by Networks*, 2003 *BYU L. REV.* 1179, 1225–26 (2003) (describing how the culture of a network that is a PLS can prevent norm violation by either providing benefits for compliance or punishing members for violating the norms).

credit for reducing a perceived risk, therefore increasing the perceived benefit it confers and the perceived harm from being expelled from the PLS. Thus, bias arbitrage may be used by PLSs to secure the abidance of its constituents with the norms it enforces.

In addition, many PLSs have centralized structures in which individuals are explicitly or implicitly elected to govern the PLSs' actions.⁸⁷ Such individuals would have incentives to engage in bias arbitrage identical to those of government's politicians. Decentralized PLSs⁸⁸ may also engage in bias arbitrage by expanding to enforce norms regarding misperceived risks and having these norms perceived to be more effective than they actually are. Decentralized PLSs do not have "politicians" who can deliberately engage in bias arbitrage, but evolutionary forces result in the survival of decentralized PLSs that engage in bias arbitrage. PLSs that engage in bias arbitrage are more likely to survive than PLSs that enforce correctly perceived norms and whose norms' effects are accurately perceived. This is because the former PLSs would likely be perceived to confer greater benefits due to receiving credit for mitigating the over-estimated risk.

Like government, and unlike some other private bias arbitrageurs, PLSs may credibly persuade the public that they can affect through their actions either the probability of a risk occurring (e.g., a group that enforces, at the pain of expulsion, a norm of not lying to another congregation member may cause members to perceive the probability of lying to decline), or the magnitude of the harm if the risk occurs (e.g., a group in which members commit to assist any other member whose house was flooded may cause members to perceive the magnitude of harm from flooding to diminish). PLSs and government each tend to have a relative advantage compared to the other in addressing certain risks.

For example, in the United States, government is more credible in addressing the risk of theft than one's local religious congregation. Therefore, one would expect to see government politicians, rather than religious officials, engage in bias arbitrage of this risk (if it is misperceived).⁸⁹ In Iraq

87. By implicit elections, I mean that there is no formal election process, but the individuals who direct the PLSs' actions can only do so with the approval of some or all of the PLSs' constituents.

88. See Aviram, *supra* note 86, at 1204–11 (describing the different structures of private legal systems). Not all PLSs are centralized. Some are decentralized and lack formal control structures. *Id.* For example, no individual has formal power to direct the PLS that causes most people standing in a queue at a cafeteria to accept the "first in time, first in line" rule (rather than, say, a rule dictating that the hungriest person would be first in line). *Id.*

89. The characteristics of massive looting make it somewhat likely to trigger cognitive biases that cause potential victims to over-estimate its likelihood and impact. I do not have any

immediately following the collapse of Saddam Hussein's regime, however, many Iraqis turned to their religious or social groups for protection against looting by forming neighborhood watches and militias.⁹⁰ If these people over-estimated the risk of looting, leaders of the religious or social groups could gain from bias arbitrage (while enhancing social welfare by causing the perceived risk to more closely approximate the actual risk).

B. Insurance Providers

Some private parties cannot credibly persuade others that they are able to reduce the magnitude of a given risk, but they can persuade that they are able to mitigate the harm imposed by the same risk. Typically, this is done by an insurance agreement—a commitment to reimburse a person for losses she might incur from a risk that materializes.⁹¹

Insurance can close a perception gap even if the insured party does not believe the insurer can prevent the risk from taking place because the insurance agreement reduces the expected harm (the probability of the harm occurring times the magnitude of the harm if it occurs) by reimbursing the harmed party. At the same time, insuring over-estimated risks can offer private benefits to the insurer because the insurer can charge premia based on the risk perceived by the insured party (i.e., the insured party would agree to pay a higher premium if the perceived risk is higher),⁹² while the cost to the insurer is based on the actual risk (i.e., the insurer only pays when the harm occurs and only as much as the harm that was actually inflicted).

Consider the following example of bias arbitrage via insurance. Suppose that the actual probability of car theft is 0.01% (1-in-10,000), but the public perceives it as being 1%. Also suppose that the harm to a car owner from theft is \$10,000. The expected harm to a car owner is \$100 (1% probability of a

information as to whether, in the case of post-Saddam Iraq, the risk to Iraqis from looting has been misperceived or not.

90. See, e.g., Shaila K. Dewan, *After the War: Southern Iraq: Militia Trained in Iran Controls a Tense Town*, N.Y. TIMES, June 27, 2003, at A12 (reporting that Majar al Kabir is controlled by Badr Brigade, which was formed to protect the town against looters).

91. See 1 APPELMAN ON INSURANCE § 1.4 (2d ed. 1996) (creating a "working definition of insurance," for which the salient feature is risk transference).

92. This assumes that there is less than perfect competition between insurers. If there were perfect competition, the premium each firm charged would be equal to its marginal cost, which is related to the actual risk. However, few markets exhibit perfect competition. Also, as will be discussed in Part V, if there are sufficiently few parties able to engage in bias arbitrage of a given bias, they are likely to divide arbitrage opportunities among themselves rather than compete over and sabotage one another's arbitrage opportunities.

\$10,000 harm), and at that expected harm the car owner may excessively avoid the risk of car theft (e.g., use the car less frequently, park the car only in more expensive or less convenient but safer locations, etc.). An insurance company could offer to insure the car owner for \$10. The car owner will gladly insure the car, paying \$10 to avoid what she perceives to be a \$100 risk. Once insured, the car owner would likely act as if the risk of car theft was significantly mitigated, thus ceasing her excessive avoidance of car theft. Unlike a law with a placebo effect, the insurance does not attempt to make her believe that the car is less likely to be stolen. The harm to her with insurance from such an event is limited to the hassle of submitting a claim and making arrangements for the interim period until she is reimbursed or provided a replacement vehicle. Meanwhile, the insurer has reaped a healthy profit from this bias arbitrage: it received \$10 to bear a risk that has the objective expected cost of \$1 (0.01% probability of a \$10,000 cost).

Naturally, insurers can only engage in this form of bias arbitrage when they are able to credibly mitigate the expected harm from the risk. In other words, they would be ineffective in arbitraging risks that are incommensurable, cannot be compensated with money, or are of such type or magnitude that the insurer is unlikely to be solvent if they occur. Thus, insurers may have an advantage over government and PLSs in bias arbitraging car theft, but they are at a disadvantage exploiting misperception of risks such as nuclear attack or serial killers.

That insurers face a disadvantage in these circumstances does not mean that they are precluded from engaging in bias arbitrage. Insurers may yet engage in bias arbitrage when other arbitrageurs (e.g., government and PLSs) are unable or unwilling to address the risk. For example, Iraqi insurers are reported to offer coverage for terrorist attacks, assassinations and explosions caused by weapons of war and car bombs.⁹³

Insurers may also bias arbitrage when risks are under-estimated, by excluding or limiting coverage of under-estimated risks. Limiting coverage of under-estimated risks reduces the cost of coverage by more than it reduces the perceived value of the coverage to the insured party, making the exclusion

93. See Robert F. Worth, *New Business Blooms in Iraq: Terror Insurance*, N.Y. TIMES, Mar. 21, 2006, at A1 (explaining that the Iraqi Insurance Company will offer a life insurance with a one page rider that adds coverage for explosions "caused by weapons of war and car bombs," assassinations, and terrorist attacks). It is difficult to assess whether this is an example of bias arbitrage. In other words, are the premia priced well above the actual risk in order to capitalize on an excessive perceived risk? The news article suggests that such insurance costs more than twenty times the cost of comparable life insurance in the United States. *Id.* I do not have data that would suggest whether the likelihood of the death (from any cause) of the insured person in Iraq is twenty times greater than it would be in the United States.

profitable to the insurer.⁹⁴ A possible example of this practice is the limitation of mental health benefits in many health insurance policies. Mental illness is frequently stigmatized and therefore people are less likely to disclose mental illness than physical illness.⁹⁵ In addition, due to the stigma, people who suffer from mental illness often do not acknowledge to themselves and treat their illness.⁹⁶ As a result, instances of mental illness are less available and the perceived likelihood of suffering from mental illness is likely underestimated.⁹⁷ Many health insurance policies distinguish between physical and mental conditions and provide more limited coverage for mental illness than for physical illness.⁹⁸

C. The Media

Bias arbitrage via law tends to be viable for situations that create positive placebo effects, but usually not for other situations. In other words, bias arbitrage is not feasible for the politician when *ex ante* the public underestimates the relevant risk (the negative placebo effect scenario). Insurers can exploit under-estimated risks through exclusions and limitations of coverage, though such actions are limited in their effect on social welfare: They prevent the exacerbation of the perception gap, but they do not mitigate the perception gap.⁹⁹ The media thrives in situations in which under-estimated risks are exposed, acting in ways that increase individuals' risk perception and therefore close their perception gaps.

The media gains prestige and credibility by bringing to the public's attention unknown or unexpected facts or assessments, often in collaboration

94. At the same time, the exclusion prevents an exacerbation of the risk misperception by a further reduction in the perceived risk that would be caused if the risk were insured.

95. See Robert M. A. Hirschfeld et al., *The National Depressive and Manic-Depressive Association Consensus Statement on the Undertreatment of Depression*, 277 J. AM. MED. ASS'N 333, 334, 337 (1997) (noting that those suffering from mental illness tend to be undertreated and stigma is sometimes a factor).

96. See *id.* at 337 (describing the factors that lead a patient not to seek treatment for depression).

97. See *id.* at 334 (noting that depression is vastly undertreated).

98. See TOM BAKER, *INSURANCE LAW AND POLICY* 273–79 (2003) (examining the treatment of claims for mental health problems by insurance companies).

99. To mitigate the perception gap in an under-estimated risk, the insurer would need to increase the perceived risk, not just exclude coverage that would have reduced the perceived risk. This would be unwelcome, however, by the insured parties who turn to the insurer to reduce, not increase, their risk.

with experts.¹⁰⁰ Misperceived risks are fertile ground for an expert to research and testify on or for a reporter to expose. While an insurer's benefit from bias arbitrage is (directly) pecuniary and a politician's benefit is electoral, the benefit to the media is receiving the public's attention and respect—and through that benefit, pecuniary benefits.¹⁰¹

To illustrate the media engaging in bias arbitrage, suppose that the public is over-optimistic about the risk of avian flu; the actual probability of an epidemic is 1%, but the public perceives the probability as 0.001% (or, alternatively, the public misperceives the disease's magnitude to be negligible, as severe as a common cold, though the disease is in fact deadly). An expert can testify about her research and announce that the disease is more likely or more severe than previously thought. The media will publicize (and probably dramatize) the expert's findings. As with bias arbitrage by politicians, some people will take the testimony at face value and some will be skeptical but track the risk to compare it with the expert's prediction. The expert and the media will gain credibility when the skeptics find that the expert's assessment is more accurate than the previous commonly-held belief.

As with politicians and insurers, bias arbitrage influences the media's choices of issues to engage. Grossly under-estimated risks are more attractive to address than moderately under-estimated ones, because the media can make more dramatic claims without overstating the risk.

The media also finds it more attractive to exacerbate under-estimated risks than to attenuate over-estimated risks. An amusing (though fictitious) anecdote of the media's slant towards risk exacerbation rather than attenuation comes

100. The roles of experts in bias arbitrage are strongly connected to the role of the media. Experts often provide the credibility to the media's manipulation of perceptions. Both experts and media then share in the private benefits of bias arbitrage.

101. See Cass R. Sunstein, *What's Available? Social Influences and Behavioral Economics*, 97 NW. U. L. REV. 1295, 1308–09 (2003) (commenting on the effects on the media from the terrorist attacks). The Article states:

"Whatever the criticisms, the reign of terror is boosting ratings for cable news networks. In fact, they are now at their highest levels since the Sept. 11, 2001, terrorist attacks. At the end of last week, Fox News Channel's average daily audience was up 27% from a month before; CNN's was up 29%; MSNBC's, up 24%." Hence the media's coverage reflects its economic self-interest, at least in part. Gripping instances, whether or not representative, are likely to attract attention and to increase ratings. Often the result is to distort probability judgments. There can be a kind of vicious circle involving the availability heuristic and media incentives, with each aggravating the other, often to the detriment of public understanding.

Id. Statistics in the quote are cited from Johanna Neuman, *In a Sniper's Grip: Media's Role in Drama Debated* (pt. 1), L.A. TIMES, Oct. 24, 2002, at 16.

from the movie, "The Shipping News."¹⁰² In this movie, the local newspaper editor, Billy, instructs a new reporter, Quoye, about journalism.¹⁰³ Billy explains to Quoye the importance of dramatic headlines.¹⁰⁴ Billy then points at dark clouds on the horizon and asks Quoye to describe the headline for reporting about them.¹⁰⁵ "Horizon Fills With Dark Clouds," tries Quoye. "Imminent Storm Threatens Village" responds Billy.¹⁰⁶ "But what if no storm comes?" queries Quoye, to which Billy replies: "Village Spared From Deadly Storm."¹⁰⁷

One possible explanation for the media's preference for risk exacerbation over risk attenuation is a concept that Timur Kuran and Cass Sunstein named "reputational cascade."¹⁰⁸ Reputational cascade is a phenomenon in which, as a perception becomes popular, more individuals are reluctant to challenge the perception out of fear that their reputation would be harmed if they disagree with the consensus.¹⁰⁹ Sunstein quotes experts who describe the gagging effect of reputational cascades.¹¹⁰ One sociologist is quoted as saying that a researcher who doubts the health threats posed by mad-cow disease is "made to feel like a pedophile."¹¹¹ A medical researcher who questioned the accuracy of some diagnoses of Lyme disease bemoaned: "Doctors can't say what they think anymore. If you quote me as saying these things, I'm as good as dead."¹¹²

Reputational cascades may explain the media's preference for risk exacerbation over risk attenuation. As explained above, engaging in (and profiting from) bias arbitrage requires identifying a risk that is misperceived. For risks that are over-estimated (i.e., are currently perceived as severe), a consensus about the severity of the risk is likely to have formed. The expert

102. THE SHIPPING NEWS (Miramax Films 2001).

103. *Id.*

104. *Id.*

105. *Id.*

106. *Id.*

107. *Id.*

108. See Timur Kuran & Cass Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 686 (1999) (describing the concept of "reputational cascades"); Timur Kuran, *Ethnic Norms and their Transformation Through Reputational Cascades*, 27 J. LEG. STUD. 623, 623 (1998) (same); Sunstein, *supra* note 26, at 1133–35 (same).

109. See Kuran & Sunstein, *supra* note 108, at 686 (defining the concept of reputational cascade); see also, *id.* at 727–29 (noting the motivations underpinning reputational cascade).

110. See Sunstein, *supra* note 26, at 1133–34 (noting that experts sometimes avoid making statements to avoid the opprobrium that would follow certain claims, no matter how accurate, that defy conventional fears).

111. *Id.* at 1133–34.

112. *Id.* at 1133.

who engages in risk attenuation would need to challenge this consensus, at a risk to her reputation.¹¹³ On the other hand, when a risk is under-estimated (i.e., the risk is currently perceived as insignificant), a consensus is less likely to have formed because the risk is less likely to be discussed and receive attention if it is not considered important. In such cases, the expert who engages in risk exacerbation does not have to challenge an existing consensus. She does not then risk the erosion in her reputation that may occur if she confronts a reputational cascade.

Why don't reputational cascades affect politicians, PLSs, and insurers in the same way, causing them to avoid risk attenuation? The difference is that politicians, PLSs, and insurers claim to take action against a risk, while the media simply reinterprets the risk without claiming to affect it. The law enacted by the politician, the norm enforced by the PLS, and the commitment of the insurer to compensate each purport to reduce either the probability or the magnitude of the risk for the public. Even if there is a consensus about the severity of the risk, the public is likely to accept that some actions can attenuate the risk. It may be more dubious to claim that the risk is attenuated without the need to take action.

The media has one advantage over other bias arbitrageurs in attenuating risk: Because it is proficient in exacerbating risk, it can enjoy a first mover advantage in attenuating the risk it has just exacerbated. For example, an ad for the local news may say: "Identity thief steals millions from local residents. Tune in at 10 p.m. to learn how to protect yourself." The ad and subsequent news report on identity theft exacerbates the perception gap while the following report on how to protect yourself (from the now inflated risk) is a form of bias arbitrage. Had the media not been so quick to engage in bias arbitrage, another arbitrageur would have likely seized on the enhanced perception gap. For example, the Federal Trade Commission could launch an enforcement initiative against identity theft, or credit card companies could offer "fraud insurance" to cardholders. But either of these responses takes longer than it does for the local television station to offer its advice.

In sum, the media is disadvantaged compared to other bias arbitrageurs in that its palette of actions that purport to attenuate risks is limited to providing information. At the same time, its effectiveness in disseminating information quickly makes it nimbler than other arbitrageurs in responding to perception gaps (including those that it creates), so it has an advantage over other potential

113. *See id.* at 1133–34 (noting several experts who report that publicly challenging consensus can damage credibility).

arbitrageurs when the risk is of a type that is perceived to be reduced by the dissemination of information to the public.

V. *The Market for Bias Arbitrage*

A. *Competition Versus Cooperation of Bias Arbitrageurs*

More than one person, and usually more than one category of persons (e.g., politicians, insurers, reporters, etc.), can engage in bias arbitrage of a given risk. However, engaging in bias arbitrage is usually a rivalrous activity: A's engagement in bias arbitrage of a given risk reduces the private benefits B can reap from bias arbitraging the same risk.¹¹⁴

For example, suppose that the relevant risk is car theft in the town of Springfield, and that the citizens of Springfield significantly over-estimate this risk. The Springfield local government can engage in bias arbitrage by conspicuously ordering the Springfield police to operate against car thieves. If it operated alone, Springfield's citizens would over time observe that the prevalence of car theft is lower than they perceived it in the past and credit the police for the reduction in car theft. Alternatively, the local insurance company can engage in bias arbitrage by marketing an insurance product tailored to address any financial harm from car theft. If it operated alone, it would sell policies at a premium that reflects the high perceived risk of car theft while paying claims at a rate that reflects the lower actual risk. Meanwhile, Springfield's citizens' concern with car theft would be attenuated because, if insured, they would not bear the financial consequences of having their car stolen.

However, if the police acted first and assured the public that its actions were reducing the probability of car theft, then the premium the insurance company could charge for car theft insurance would decline. Similarly, if the insurance company acted first, then the citizens of Springfield would be less concerned with car theft. The Springfield local government would face less pressure to address car theft and would receive less credit for reducing this risk.

In other words, just as with other forms of arbitrage, one person's engagement in bias arbitrage dissipates the potential benefit for others who would engage in bias arbitrage of the same risk. As a result, competition may take place over the ability to engage in bias arbitrage. Such competition may

114. See Robert B. Ekelund, Jr. & Robert F. Hebert, *Uncertainty, Contract Costs and Franchise Bidding*, 47 S. ECON. J. 517, 518 n.3 (1980) (noting that the act of "entrepreneurs taking advantage of disequilibrium conditions," which is arbitrage, is a rivalrous activity).

involve positive efforts (i.e., attempting to arbitrage before another competitor will) or negative efforts (i.e., sabotaging a competitor's bias arbitrage efforts).

Negative efforts are likely to be less common than positive efforts because the main form of sabotage of bias arbitrage is exposing that the action has a placebo effect.¹¹⁵ Such exposure, however, may close the perception gap (and eliminate the saboteur's bias arbitrage opportunity) without benefiting the saboteur. It may also make the public cynical of solutions to the relevant risk, making the success of the saboteur's bias arbitrage efforts less likely.

When competing, each potential arbitrageur has a limited palette of vehicles it can credibly use to convey the placebo effect: legislators can enact or amend laws; agencies and the executive branch can enforce laws conspicuously; insurers can underwrite policies; and the media can create newspaper, radio or television reports. Competition between them shapes how law is created and enforced. For example, if a misperceived risk is already addressed by an existing law, a legislator may rush to create a specific law to bias arbitrage before a law enforcement agency does the same through enforcement of existing law. Thus, Congress enacted a law creating a separate crime of carjacking, even though the act of carjacking had already consisted of a set of serious crimes, including robbery, theft, assault, and possibly kidnapping.¹¹⁶ Similarly, identity theft laws may create crimes for acts that are already forms of theft or fraud.¹¹⁷ Law enforcers and courts, meanwhile, may attempt to preempt legislators by expanding their interpretation of existing laws and enforcing them against the misperceived risk. This competitive dynamic may explain the growing complexity of both legislated law and the case law and agency precedent that interprets it. Of course, when law complexity itself

115. For example, suppose that the public over-estimates the risk of terrorism, and politician *A* enacts a law to increase security (over-selling its effects so as to bias arbitrage). Rival politician *B* can call *A*'s bluff and say that *A*'s law does nothing (or not much) to reduce terrorism. This would likely be a poor strategy because, if indeed the public over-estimates the risk of terrorism and they hear *A* claiming that the risk will decline and *B* claiming that it will not, they would sway towards *A* and against *B* when they see over time that the risk of terrorism is lower than they originally perceived (presumably, they would think, because of *A*'s law). *B*'s credibility will suffer even if she is right in claiming *A*'s actions are ineffective. Alternatively, *B* can engage in a conspicuous action that purports to reduce terrorism (e.g., enact another law or conspicuously enforce an existing law) and claim that it is her actions, not *A*'s, that "reduced" the risk of terrorism. Employing this strategy, *B* will not lose credibility—at best, people will believe it is her actions and not *A*'s that "reduced" the risk of terrorism; at worst, that it was *A*'s actions that reduced the risk and that *B* was neither helpful nor harmful.

116. See 18 U.S.C. § 2119 (2000) (making carjacking a Federal crime).

117. See, e.g., ARK. CODE ANN. § 5-37-227 (2007) (criminalizing identity theft); GA. CODE ANN. § 16-9-121 (2007) (listing the elements of identity theft in Georgia); IND. CODE § 35-43-5-3.5 (2007) (criminalizing "identity deception").

becomes an issue of excessive concern, legislatures may rush to assuage fears by conspicuously wiping the slates clean and rewriting a simplified law.¹¹⁸

Because competition dissipates the potential arbitrageurs' profits, they may find it beneficial to collude. In many circumstances, the market for bias arbitrage would be attractive for collusion. Barriers to entry tend to be high and the number of potential competitors tends to be low. Politicians and PLSs can only engage in bias arbitrage if the public perceives them as able to affect by their actions either the probability of the relevant risk occurring or its magnitude. An insurer can only engage in bias arbitrage if the public perceives it as financially able to honor the insurance agreement. An expert can only engage in bias arbitrage if the public perceives her as very knowledgeable in the area pertaining to the risk. All of these potential competitors and the media must have the ability to reach many people in the relevant population in order to manipulate their perceptions. All potential competitors also must have some ability to detect a misperception of a risk in order to target the risk in their bias arbitrage.¹¹⁹ Thus, for any given risk, the number of people who are likely to successfully bias arbitrage is small and is unlikely to increase significantly in the short term.

The mechanisms of cooperation and the suppression of competition between bias arbitrageurs are a fertile ground for future research and are too vast to address in this Article. One expects profit-maximizing politicians to vacillate between suppressing extra-legal competition to protect their own legal placebo effects and accommodating private bias arbitrage when they cannot successfully exclude it (or when it is complementary rather than competitive with government's bias arbitrage). In this respect, bias arbitrage may differ vastly according to the political culture of the state, from laissez-faire through

118. See, e.g., David E. Rosenbaum, *The Tax Reform Act of 1986: How the Measure Came Together; a Tax Bill for the Textbooks*, N.Y. TIMES, Oct. 23, 1986, at D16 (noting that President Reagan's charge for a simplified tax code in his 1985 State of the Union address led to the Tax Reform Act of 1986, Pub. L. 99-514, 100 Stat. 2085 (codified in scattered sections of 26 U.S.C.)).

119. In other words, a would-be bias arbitrageur must be less susceptible to the cognitive biases that create the misperception than the population that misperceives the risk. This limits the spectrum of would-be bias arbitrageurs, but evidence suggests that some individuals are likely to be less susceptible to a given cognitive bias and are therefore able to recognize and exploit a misperception. See Rachlinski, *supra* note 44, at 216–23 (noting that several factors such as cognitive ability, experience, education and even demographic factors may influence an individual's cognitive biases); see also Guthrie & Rachlinski, *supra* note 47, at 2047 ("The three phenomena tested here—anchoring, framing, and the self-serving bias—are well known to influence judgment in many contexts, yet we found that the insurers largely resisted their influence."). Cf. Chris Guthrie, Jeffrey J. Rachlinski & Andrew J. Wistrich, *Inside the Judicial Mind*, 86 CORNELL L. REV. 777, 816 (2001) (suggesting that judges are susceptible to several cognitive biases).

government interventionism to central planning. The more interventionist the government, the greater its ability to suppress private bias arbitrageurs, which would allow politicians not only to reap all of the benefits of bias arbitrage, but also reduce the need for government to provide placebo effects quickly. Absent competition with other bias arbitrageurs, the only temporal constraint on the politician is the gradual debiasing of the public as people adjust their perceptions to observations of the objective occurrence of the risk.

B. Artificial Creation of Perception Gaps

An opportunity for bias arbitrage occurs when a gap exists between the actual and perceived risks, and the benefits of bias arbitrage (both private and to social welfare) increase as this gap grows. Knowing this, potential arbitrageurs have the incentive to first create a perception gap (or exacerbate an existing gap) and then exploit that gap.

For example, a politician may first foster a "scare campaign", attempting to exploit cognitive biases to manipulate the public into thinking that a security risk or ecological threat is more severe than it actually is. Then, if successful, the politician would sponsor a law that would address the security risk or ecological threat and would attempt to persuade the public that the risk has been attenuated by the law. Private bias arbitrageurs may similarly attempt to exacerbate the perception of risk prior to engaging in bias arbitrage. For example, an insurance company may support publicity that suggests that medical malpractice lawsuits are frequent, successful and costly in order to have clients expand their policy limits (at a higher premium).¹²⁰

Unlike bias arbitrage, the artificial creation or exacerbation of perception gaps is unambiguously harmful to social welfare. As discussed in Part III.C, perception gaps cause either excessive or insufficient avoidance of activities that expose one to the misperceived risk, as well as excessive or insufficient efforts to confront the misperceived risk. Unfortunately, the ability to engage in bias arbitrage makes the development of perception gaps attractive to potential arbitrageurs.

120. See Kent Syverud, *On the Demand for Liability Insurance*, 72 TEX. L. REV. 1629, 1642–46 (1994) (describing the incentive of liability insurers to persuade their clients to increase their liability policy limits). This may be done by scare campaigns that exacerbate the client's risk perception (and therefore the client's demand for, and perceived value from, insurance). On examples of scare campaigns in the context of medical malpractice insurance, see TOM BAKER, *THE MEDICAL MALPRACTICE MYTH* 152–53 (2005). On the over-estimation of the risk of medical malpractice liability, which may be in part the result of such efforts, see *id.* at 68–92.

The private incentive to create a perception gap depends on the degree of competition over the subsequent bias arbitrage. Once a perception gap is created, any potential bias arbitrageur can engage in bias arbitrage to close it. Therefore, the arbitrageur who expended efforts creating the gap may find that another arbitrageur free-rides on her efforts and closes the perception gap through bias arbitrage. For example, a local politician may launch a scare campaign over crime in her town, causing the public to over-estimate the likelihood of car theft in the hope of later receiving credit for directing the police to focus operations on car theft. Before the politician concludes her scare campaign and moves on to engage in bias arbitrage, the local insurance company may market policies specially tailored to address car theft, mitigating the public's concern and preempting the politician's plans. Conversely, the insurance company could direct the scare campaign in the hopes of selling high-priced car theft policies but be preempted by a politician who enacts a law to reduce car theft.

Competition, besides deterring some arbitrageurs from creating perception gaps that others would free-ride, also reduces the extent of a perception gap that is artificially created. For example, a "monopolist" politician may want to scare people about terrorism up to a level of complete hysteria before offering the panacea (of a newly enacted law or of a law enforcement initiative) and taking credit for solving a gargantuan problem. But if that politician faced competition, by the time he would create a moderate scare some other arbitrageur would already jump into the fray and offer a solution, mitigating the perceived risk before it reached peak profitability (to a monopolist). If the first politician foresees this, she can preempt the second politician and offer a remedy (thus stopping the scare campaign) earlier. The result is that increased competition over bias arbitrage results in faster but lower magnitude fluctuations in risk perception.

Thus, the private profitability of creating perception gaps depends on the degree of competition in the market and the ability of the perception gap creator to collude or to suppress competition. This suggests that a political culture that is more interventionist (and thus better facilitates government's ability to suppress private bias arbitrageurs) is more likely to create perception gaps to support politicians' engagement in bias arbitrage. These incentives become even more powerful when the political structure allows certain politicians to exclude rival politicians from dissipating their rents from creating a perception gap. Thus, at the extremes, a hierarchal, centrally planned regime is likely to have more perception gaps artificially created by its politicians (e.g., via scare campaigns) than a pluralistic, laissez-faire regime.

VI. Conclusion: The Future of Bias Arbitrage

This Article engaged in a descriptive analysis of bias arbitrage, not a prescriptive one. I am not attempting to address the morality of bias arbitrage. However, it is noteworthy that moral reservations have been raised as to actions that exploit perception gaps, even when the transaction seems to improve social welfare and the arbitrageur's main goal was not to profit from the transaction.¹²¹

The study of cognitive biases is in its infancy. Improvements in this nascent field will increase the viability of bias arbitrage in two ways. First, better understanding of cognitive biases would allow for more accurate predictions of the degree to which a given risk is misperceived. This, in turn, would make it easier for potential risk arbitrageurs to identify suitable risks to arbitrage and reduce the likelihood of "overshooting" by counter-biasing in excess of the ex ante perception gap. Second, better understanding of cognitive biases would provide more exact tools for the counter-biasing that takes place in bias arbitrage. This enhanced capacity to cause cognitive biases is prone to abuses, but if available, it would very likely be used, including for the purpose of bias arbitrage.

Bias arbitrage is probably as old a phenomenon as any other form of arbitrage. Not too long ago, the arbitrage of commodities and currency was in a similar state as bias arbitrage is today—common but not ubiquitous or exact. Transportation and information costs caused significant price gaps between different markets.¹²² For example, at the end of the seventeenth century, "a bolt of muslin cost 3 reals in the mill at La Mans, 6 in Spain and 12 in America" (300% more than La Mans).¹²³ In the late nineteenth century, an Ottoman Pound (a gold coin) traded in Jerusalem for 124 Ottoman Grush (a silver coin).¹²⁴ In Jaffa, about thirty-five miles from Jerusalem, the Pound traded for

121. One example involves volunteers for testing drugs that prevent breast cancer. Such volunteers risk unknown and possibly very serious side effects of the tested drug, in return for the hope to prevent the onset of the disease. Doctors expressed concern that women who overestimate the risk from breast cancer may be too willing to risk the drug's potential side effects. Rob Stein, *Study of Breast Cancer Pill Raises Hopes and Concerns*, WASH. POST, May 22, 2005, at A1 ("Women have an increased fear of getting breast cancer over and above what the true likelihood is," said Heidi Malm, associate professor of bioethics at Loyola University Chicago. "That could lead people to enroll in studies with probably a bigger hope of benefit than is actually realistic.").

122. See FERNAND BRAUDEL, *THE WHEELS OF COMMERCE* 168 (Siân Reynolds trans., 2002) (describing the "trading profit" resulting from transportation costs and information differences in geographically separated markets).

123. *Id.*

124. See SHMUEL AVITSUR, *ḤAYE YOM-YOM BE-ERETS-YISRA'EL: BE-ME'AH HA-TESHA'*

144 Grush.¹²⁵ In Gaza, only about fifty-five miles from Jerusalem, it traded for 216 Grush (74% more than Jerusalem).¹²⁶ Perception gaps today mirror these wide price gaps.¹²⁷

As transportation, communication and information technology improved and prices dropped, currency and commodity arbitrage became less expensive, more ubiquitous, and price gaps closed. Price gaps that persisted in the past for months and years now close within fractions of a second. For example, a Kansas City stock arbitrageur recently moved his firm's computers from Kansas City to New York to reduce the time it takes for his trading orders to be executed.¹²⁸ Since the computer signal travels at nearly the speed of light, orders from Kansas City take only 1/50 of a second to be executed.¹²⁹ Apparently, many price gaps are closed within this short time. The arbitrageur stated that without moving the computers to New York, which reduced order execution time to 1/1000 of a second, he would be out of business.¹³⁰

'ESREH [DAILY LIFE IN THE LAND OF ISRAEL IN THE NINETEENTH CENTURY] 292 (1972) (providing the aforementioned figures but not providing a precise date for these figures).

125. *Id.*

126. *Id.*

127. Though both examples demonstrate significant price gaps, they also indicate that some arbitrage did in fact take place. Muslin was not produced in America, so its availability at any price at all suggests some merchants arbitrated and narrowed the price gap from infinite to a "mere" 300%. Likewise in the currency example, the official value of the Ottoman Pound was 100 Grush. Yet the Pound was exchanged for a higher amount, suggesting that merchants arbitrated by buying gold Pounds for silver coin and selling the under-priced gold to goldsmiths and foreign mints, reducing the availability of Pounds and pushing up their price in silver.

Bias arbitrage today is in a similar situation: It occurs and mitigates perception gaps despite the nascent state of the science of cognitive biases, but it would likely increase in volume (and reduce perception gaps further) if our ability to evaluate and manipulate cognitive biases improved.

128. Aaron Lucchetti, *Firms Seek Edge Through Speed As Computer Trading Expands*, WALL ST. J., Dec. 15, 2006, at A1 (reporting how trading companies attempt to reduce time it takes orders to reach the computers of electronic exchanges).

129. *Id.*

130. *See id.* (suggesting that arbitrageurs depend on even small delays in relaying information). Another interesting illustration of the effect of technology on arbitrage and price gaps is the effect of the use of cellular phones by fishermen in Kerala, a region in the south of India. *To Do With the Price of Fish*, ECONOMIST, May 12, 2007, at 84 (citing Robert Jensen, *The Digital Provide: Information (Technology), Performance and Welfare in the South Indian Fisheries Sector*, Q.J. ECON. (forthcoming 2007)). Prior to the use of cellular phones, Kerala fishermen would return with the fish they caught to their local beach market. *Id.* When fish were plentiful in their fishing grounds, the local market would be oversupplied, and excess fish were thrown away, while in markets just a few miles away demand for fish exceeded supply. *Id.* Cellular phones allowed the fishermen to call coastal markets while still at sea, and sail to the market offering the best price (which would be the market with the greatest unsatisfied demand). *Id.* As soon as cellular phone coverage became available in a region, the proportion of

It is hard to imagine perception gaps survive no more than fractions of a second, perhaps because it is hard to imagine computers engaging in bias arbitrage. But we may well see an analogous trend of increased bias arbitrage leading to smaller and less sustainable perception gaps, as the relevant technology advances. The study of cognitive biases serves the same role in bias arbitrage as technologies of transportation and information transmission serve in commodity and currency arbitrage. Reductions in the cost of information technology allow traders to learn faster about discrepancies in the price of a commodity in different markets, just as improved knowledge of cognitive biases allows better estimates of discrepancies between actual and perceived risk. Similarly, just as reductions in the cost of transportation allow arbitrageurs to close the price gap by shipping the commodities to higher-priced markets, so do improvements in understanding how to cause cognitive biases allow for more effective counter-biasing, which closes the perception gap.

A reduction in the cost of engaging in bias arbitrage may increase the role of market structure (in the mixed public-private market for bias arbitraging) in determining the volume of bias arbitrage that takes place. Competitive markets would see relatively few artificial creations of perception gaps and more immediate closure of perception gaps through bias arbitrage. Less competitive markets would see an increase in artificial creations of perception gaps, governmental and private actions aimed at either suppressing arbitrage rivals or coordinating bias arbitrageurs and dividing arbitrage opportunities among them. Either way, such markets would likely have slower elimination of perception gaps and greater private payoffs to the bias arbitrageur. In markets of either structure, the amount of legal activity that is driven by bias arbitrage is likely to increase. As it does, legal scholarship would need to heed to the role law plays, not only in manipulating incentives, but also in manipulating perceptions.

fishermen in that region selling their fish beyond their home market rose from 0% to 35%. *Id.* "Waste had been eliminated and the 'law of one price'—the idea that in an efficient market identical goods should cost the same—had come into effect, in the form of a single rate for sardines along the coast." *Id.*