"MAY THE ODDS BE EVER IN YOUR FAVOR":[†] LOTTERIES IN LAW

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INTRODUCTION

In 1982, a New York City Criminal Court judge determined a prison term in a misdemeanor case by the flip of a coin.[1] Consequently, the State Commission on Judicial Conduct removed the judge from office, denying him any future service on the bench.[2] This response was consistent with long-established views on the use of lotteries in legal decision making.[3] As early as 1811, the Supreme Court of Pennsylvania opined that "[t]he decision of a contested case by lot or chance must be reprobated by every honest man."[4] Not surprisingly therefore, legal theorists have rarely discussed the role of randomization in law and have never done so systematically and comprehensively.[5] Still, we believe that the intuitive revulsion derives from the intricacies of judicial decision making, where randomization seems to defy existing law applicable to the facts of the case. Randomization may be more acceptable in other contexts as a means of allocating resources or burdens not previously allocated under the law.[6] In fact, the variety of instances in which the law actually resorts to lotteries is overwhelming, and several scholars have called for randomization in

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    1.   William G. Blair, *Flip of Coin Decides Jail Term in a Manhattan Criminal Case*, N.Y. TIMES (Feb. 2, 1982), http://www.nytimes.com/1982/02/02/nyregion/flip-of-coin-decides-jail-term-in-a-manhattan-criminal-case.html.

    2.   E.R. Shipp, *Friess Is Barred from Ever Being New York Judge*, N.Y. TIMES, (Apr. 7, 1983), http://www.nytimes.com/1983/04/07/nyregion/friess-is-barred-from-ever-being-new-york-judge.html; *see also In re* Brown, 662 N.W.2d 733, 737 (Mich. 2003) (holding that tossing a coin to decide a case was judicial misconduct).

    3.   JON ELSTER, SOLOMONIC JUDGEMENTS: STUDIES IN THE LIMITATIONS OF RATIONALITY 99 (1989) ("By and large . . . random selection is not allowed [in legal decision making].").

    4.   Lessee of Cluggage v. Swan, 4 Binn. 150, 155 (Pa. 1811).

    5.   *See infra* notes 53–59 and accompanying text.

    6.   *Cf.* Adam M. Samaha, *Randomization in Adjudication*, 51 WM. & MARY L. REV. 1, 5 (2009) ("Judges strongly condemn randomization for their own merits decisions . . . [but] are likely to retreat when other officials consciously randomize.").

even more legal contexts. Yet general theoretical literature on this fascinating legal phenomenon remains sparse.

This Article has three underlying goals. First, it fills the aforementioned gap by providing a systematic and comprehensive theoretical framework for assessing lotteries' role in legal resource allocation. It integrates fairness and efficiency concerns, critically evaluating and applying insights from various disciplines, including economics, philosophy, political science, psychology, and theology. This multidisciplinary framework—of unprecedented breadth and complexity— provides lawyers and policymakers with a powerful analytical tool for assessing the possible use of random allocation schemes. Second, the Article recognizes the importance and highlights the pervasiveness of lotteries in resource allocation by and under the law. It does so by analyzing and appraising the historical and present role of lotteries in numerous legal contexts through the theoretical prism. It also advocates a cautious expansion of the use of lotteries in other contexts, a notion that runs counter to the basic intuition that the law must be committed to reason and certainty. Third, the Article substantiates a jurisprudentially provocative thesis: While random-based schemes can be and are employed in many settings, there is no consistent set of justifications for all applications. The rationalization is highly varied and context-specific. This ambitious three-pronged roadmap is in line with that underlying the first paper in our planned trilogy on non-conventional allocation methods, which focused on queues, or the principle of "first in, first out" (FIFO).[7] The trilogy as a whole aims to motivate lawyers and policymakers to think outside the box in tailoring appropriate strategies to different allocation problems.

Admittedly, randomness is a somewhat ambiguous concept. However, it usually means that "every member of a given population has an equal chance of being selected,"[8] a property commonly known as "equiprobability."[9] In this Article we use interchangeably the terms random-based allocation, random selection, chance-based allocation, selection by lot, and lottery to describe an allocation method based on

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7.   Ronen Perry & Tal Z. Zarsky, *Queues in Law*, 99 IOWA L. REV. 1595, 1596 (2014). The third paper in the trilogy, which discusses rotation, was recently accepted for publication. Ronen Perry & Tal Z. Zarsky, *Taking Turns*, 43 FLA. ST. U. L. REV. (forthcoming 2016).

8.   Phyllis Jo Baunach, *Random Assignment in Criminal Justice Research*, 17 CRIMINOLOGY 435, 436 (1980); *see also* Stephen E. Fienberg, *Randomization and Social Affairs: The 1970 Draft Lottery*, 171 SCI. 255, 258 (1971) ("[The dictionary] defines *random* as 'proceeding, made, or occurring without definite aim, reason, or pattern,' . . . . On the other hand, *random* as used in statistics is a technical term . . . [which denotes] equal probabilities.").

9.   *See* ELSTER, *supra* note 3, at 47 (explaining that a random process is equiprobabilistic); Lewis A. Kornhauser & Lawrence G. Sager, *Just Lotteries*, 27 SOC. SCI. INFO. 483, 485–88 (1988) (discussing equiprobability).

equiprobability.[10] Two conceptual caveats are due. First, a distinction exists between an objectively (or statistically) random process, in which equiprobability is truly achieved, and an epistemically random process, in which equiprobability is secured only as far as any observer can tell.[11] Objective randomness is a theoretical concept: It is acknowledged that equiprobability can be approximated at best.[12] But for the purpose of our theoretical analysis, epistemic randomness usually suffices. Second, in certain cases, people who possess a particular characteristic are granted more than a single "participation right" in the lottery, which in practice assigns different selection probabilities to different participants. An allocation method that prioritizes some individuals this way is known as a weighted lottery. For instance, in the Georgia Land Lottery of 1832 each citizen had "one chance," while members of certain groups (orphans, Revolutionary War veterans, etc.) had "two chances."[13] In popular culture, *The Hunger Games* trilogy featured a weighted lottery for "reaping" participants in the deadly games. The candidates' ages and past requests for food and supplies determined the number of times their names were entered into the lottery.[14]

As we demonstrate below, random selection is endorsed in many and varied legal contexts, which can be described through several variables. The first—dichotomous—variable is the allocation's object. Random selection may be used to allocate benefits and burdens alike. Of course, this difference is somewhat semantic because an allocation of a burden can also be portrayed as an allocation of the benefit of not having to bear that burden.[15] The group of "tragic-winners" in the allocation of a burden is a complement of the group of "winners" in the allocation of the benefit of not bearing that burden. The second—dichotomous—variable is the mode of participation in the lottery. This may be mandatory, in the sense that members of a particular group are forced to participate, as in the case of military drafts or jury selection. It can also be voluntary, in the sense that members of a particular group are allowed to participate, as in most allocations.[16] An innate correlation exists between the first two variables because if a burden is allocated participation should generally be

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10.   *Cf.* Hank Greely, Comment, *The Equality of Allocation by Lot*, 12 HARV. C.R.-C.L. L. REV. 113, 114 & n.11 (1977) (using these terms interchangeably).

11.   ELSTER, *supra* note 3, at 95–96; Samaha, *supra* note 6, at 10–12.

12.   Fienberg, *supra* note 8, at 258.

13.   ELSTER, *supra* note 3, at 47.

14.   SUZANNE COLLINS, THE HUNGER GAMES 15–16 (2008).

15.   *See* Kornhauser & Sager, *supra* note 9, at 484, 492 (explaining that benefits include exemptions from burdens). Although seemingly semantic, the framing of the allocation's object as a resource or a burden might have psychological implications.

16.   *See* NEIL DUXBURY, RANDOM JUSTICE: ON LOTTERIES AND LEGAL DECISION-MAKING 1 (1999) (discussing this distinction).

mandatory, whereas if a benefit is allocated participation is usually, though not always, voluntary.[17] The third—continuous—variable is the accessibility level. As Jon Elster correctly observed, there are no purely random allocations: All lotteries are preceded by a preliminary screening (pre-selection) based on need, merit, willingness to pay, and the like.[18] Stricter screening will result in a smaller group of lottery participants. Put differently, the higher the eligibility threshold, the lower the accessibility level.

The prevalence of lotteries in law, hence the importance of this Article, can be easily established. Random selection may be and is endorsed in various ways in the legal world. In the first endorsement mode, substantive legal rules allocate particular benefits or burdens by lot. This usually happens when several people have equally strong claims to an indivisible resource.[19] Examples abound. In some countries land was allocated randomly in the past,[20] and in others low-rent public housing was allocated randomly among eligible parties.[21] In many jurisdictions, licenses and leases were allocated randomly. These include liquor licenses,[22] broadcasting licenses, such as television broadcasting[23] and cellular phone operations,[24] oil and gas drilling leases,[25] and rights to transport natural gas through pipelines.[26] Diversity-immigration visas are allocated in random

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17.   Note, however, that it is not always clear whether the allocated object is a resource or a burden. In the end, the distinction hinges on the common perceptions.

18.   ELSTER, *supra* note 3, at 67–68 ("I know of no instance of social lotteries without some preselection or postselection scrutiny . . . .").

19.   *See infra* notes 151–153 and accompanying text.

20.   *See* ELSTER, *supra* note 3, at 47, 64 (discussing land lotteries in Georgia and Oklahoma).

21.   *See, e.g.*, Holmes v. N.Y.C. Hous. Auth., 398 F.2d 262, 265 (2d Cir. 1968) (opining that allocation by lot is reasonable); Gary E. Bolton et al., *Fair Procedures: Evidence from Games Involving Lotteries*, 115 ECON. J. 1054, 1055 (2005) (discussing randomization in allocating public housing); Greely, *supra* note 10, at 126–30 (same). In Japan, public housing is still allocated through lotteries. ANN WASWO, HOUSING IN POSTWAR JAPAN: A SOCIAL HISTORY 29, 52, 87 (2002).

22.   Hornsby v. Allen, 330 F.2d 55, 56 (5th Cir. 1964) (explaining that allocation by lot is reasonable).

23.   47 U.S.C. § 309(i) (2012) ("[I]f there is more than one application for any initial license or construction permit, then the Commission shall have the authority to grant such license or permit to a qualified applicant through the use of a system of random selection."); *see also* Star Television, Inc. v. FCC, 416 F.2d 1086, 1095 (D.C. Cir. 1969) (suggesting use of lotteries); Greely, *supra* note 10, at 130–35 (discussing randomization in allocating broadcasting licenses).

24.   Folden v. United States, 379 F.3d 1344, 1347 (Fed. Cir. 2004) (discussing the use of lotteries in this context); John R. Boyce, *Allocation of Goods by Lottery*, 32 ECON. INQUIRY 457, 470–71 (1994) (same).

25.   Boyce, *supra* note 24, at 471–72 (discussing the use of lotteries by the Bureau of Land Management); Abraham E. Haspel, *Drilling for Dollars: The Federal Oil-Lease Lottery Program*, REG., July–Aug. 1985, at 25 (same).

26.   PG&E Gas Transmission, Nw. Corp. v. FERC, 315 F.3d 383, 384 (D.C. Cir. 2003) (noting the use of a lottery).

order among eligible applicants.[27] Random selection has also been used throughout history for the allocation of political power. In ancient Athens, most public officials were selected by lot.[28] In the Renaissance period, lotteries served to choose the principal councilors in the city of Barcelona, to appoint the Venetian *doge*, and to select members of the Florentine city government (the *Signoria*).[29] In the United Kingdom, if two or more candidates for Parliament score an equal number of votes, the winner is still decided by lot;[30] the same is true in several states, if two mayoral candidates receive an identical number of votes.[31] In the academic literature, chance-based allocation rules have been advocated in even more provocative and controversial contexts, such as allocating procreation rights[32] and determining custody of children in disputed cases.[33]

Lotteries have never been limited to the allocation of resources, but have been employed in the allocation of burdens and risks as well. Most notably, from the Civil War[34] through the two World Wars[35] and until the Vietnam War,[36] military draftees in the United States were selected randomly.[37] Occasionally, random drafts were also common in other countries, such as France from the seventeenth to the nineteenth century.[38] Similarly, people are selected for jury duty by lot.[39] This practice has roots in ancient Athens and prevails in Anglo-American and Scandinavian

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27. 8 U.S.C. § 1153(e)(2) (2012); Carrillo-Gonzalez v. INS, 353 F.3d 1077, 1078 (9th Cir. 2003) (discussing the diversity immigration visa lottery); JON ELSTER, LOCAL JUSTICE: HOW INSTITUTIONS ALLOCATE SCARCE GOODS AND NECESSARY BURDENS 57–59, 72 (1992) (same).

28. ELSTER, *supra* note 3, at 80–81; Akhil Reed Amar, Note, *Choosing Representatives by Lottery Voting*, 93 YALE L.J. 1283, 1290 (1984).

29. DUXBURY, *supra* note 16, at 30–32; ELSTER, *supra* note 3, at 81–82.

30. Representation of the People Act, 1983, c. 2, sch. 1, Rule 49 (U.K.).

31. Bolton et al., *supra* note 21, at 1055 (discussing California law); Carol Necole Brown, *Casting Lots: The Illusion of Justice and Accountability in Property Allocation*, 53 BUFF. L. REV. 65, 68–69 n. 5 (2005) (discussing Utah law).

32. Greely, *supra* note 10, at 135.

33. ELSTER, *supra* note 3, at 123–74.

34. Act of Mar. 3, 1863, ch. 75, 12 Stat. 731 (1863), *available at* http://memory.loc.gov/cgi-bin/ampage?collId=llsl&fileName=012/llsl012.db&recNum=762 ("An Act for enrolling and calling out the national Forces, and for other Purposes.").

35. Fienberg, *supra* note 8, at 256–57.

36. *Id.* at 256 (discussing Richard Nixon's executive order on this matter).

37. DUXBURY, *supra* note 16, at 43 n.2; Samaha, *supra* note 6, at 5; Bruce J. Winick, *A Preliminary Analysis of Legal Limitations on Rehabilitative Alternatives to Corrections and on Correctional Research*, *in* NEW DIRECTIONS IN THE REHABILITATION OF CRIMINAL OFFENDERS 328, 361–62 (Susan E. Martin et al. eds., 1981); Dael Wolfle, *Chance, or Human Judgment?*, 167 SCI. 1201, 1201 (1970).

38. ELSTER, *supra* note 3, at 64.

39. 28 U.S.C. § 1863 (2012) ("[p]lan for random jury selection"); United States v. Davis, 518 F.2d 81, 82 (10th Cir. 1975) (explaining this practice); DUXBURY, *supra* note 16, at 12, 74–75 (discussing random jury selection in the United States); ELSTER, *supra* note 3, at 62 (same); Amar, *supra* note 28, at 1287 (same).

jurisdictions to the present day.[40] Finally, in the law of the sea, random-based rules have endured until modern times. When a ship is jeopardized and several passengers must be thrown overboard to save all the others, "if time [exists] to cast lots, and to select the victims, then . . . sortition should be adopted."[41] Similarly, if food aboard a ship is exhausted, "and a sacrifice of one person is necessary to appease the hunger of others, the selection is by lot."[42] At least one scholar has suggested a rule whereby lotteries can be used to select a person to be killed for the purpose of saving the lives of several people in need of transplants.[43]

In the second endorsement mode, rules of conduct, which are not in themselves based on chance, are enforced randomly. One category of random enforcement is random inspection, such as randomized DUI or traffic-violation checks by the police,[44] baggage inspections by border control authorities,[45] and tax audits by the IRS.[46] Another category of random enforcement, which is beyond the scope of this Article due to its unique complexity and the breadth of existing literature, is institutionalized moral luck. For instance, enforcing the standard of care in tort law relies heavily on chance. Tort law aims to prevent the creation of unreasonable risks, but liability is imposed only if the particular risk has materialized, and this is a matter of chance. Put differently, if several people expose others to exactly the same risks, those who created the materialized risks are liable, whereas those who created non-materialized risks are not, despite the lack of a moral difference between members of the two groups.[47] Tort liability is premised on a natural lottery.

In the third endorsement mode, the legal rules are neither chance-based nor randomly enforced, but case outcomes are affected by chance-based features of the judicial process. As explained above, in many jurisdictions jurors are selected randomly. In fact, this is a two-layered random allocation. In addition to allocating the burden of jury duty, this method imbues the fact-finding body with an element of chance, making it more

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40. ELSTER, *supra* note 3, at 94–95.

41. United States v. Holmes, 26 F. Cas. 360, 367 (Pa. Cir. Ct. 1842).

42. *Id.*

43. John Harris, *The Survival Lottery*, 50 PHIL. 81, 81–87 (1975).

44. *See* Delaware v. Prouse, 440 U.S. 648, 661 (1979) (discussing the constitutionality of such practices under the Fourth Amendment).

45. Felix Oberholzer-Gee et al., *Fairness and Competence in Democratic Decisions*, 91 PUB. CHOICE 89, 89 (1997).

46. DUXBURY, *supra* note 16, at 81; ELSTER, *supra* note 3, at 63.

47. DUXBURY, *supra* note 16, at 10; TERENCE G. ISON, THE FORENSIC LOTTERY: A CRITIQUE ON TORT LIABILITY AS A SYSTEM OF PERSONAL INJURY COMPENSATION *passim* (1967); Marc A. Franklin, *Replacing the Negligence Lottery: Compensation and Selective Reimbursement*, 53 VA. L. REV. 774 *passim* (1967).

representative of society.[48] Moreover, in many jurisdictions the cases are assigned to judges randomly.[49] An extreme example of randomizing the legal process is the 1982 New York City Criminal Court case in which the judge determined a prison term for a misdemeanor by the flip of a coin.[50] However, judicial decision making by lot is generally prohibited.

In the fourth endorsement mode, the law endorses random selection by explicitly or implicitly allowing allocations by lot. This seems to be the weakest form of endorsement. Although the law and law enforcement agencies do not employ random selection, it is legitimized by not being prohibited and through the maintenance of peace and order during the allocation. For example, the law implicitly allows colleges to select new students from among those qualified through lottery,[51] employers to randomly hire and lay off employees,[52] and event organizers to allocate tickets by lot.[53] The law may explicitly allow and regulate chance-based enterprises such as national and state lotteries or casinos.[54]

Despite the high prevalence and potential application of lotteries in law, legal literature on this matter is scant. To be sure, legal scholars have not ignored random-based processes. For example, in *Tragic Choices*, Guido Calabresi and Philip Bobbitt opined that lotteries "can frequently be appended *faute de mieux* to market and political decision procedures when the limits of mindful choice are reached."[55] However, existing legal literature is unsatisfactory. Some authors focus only on specific manifestations, such as random assignment of cases to judges,[56] random allocation of property,[57] and so forth.[58] Additionally, legal scholars usually view the question from a single theoretical or disciplinary perspective, such

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48.   However, random selection may preclude small minorities. Therefore, the British Royal Commission on Criminal Justice proposed proportionate representation of minorities in juries. DUXBURY, *supra* note 16, at 80–81.

49.   ELSTER, *supra* note 3, at 93; Samaha, *supra* note 6, at 5.

50.   *See supra* notes 1–2.

51.   Wolfle, *supra* note 37, at 1201.

52.   ELSTER, *supra* note 3, at 65.

53.   Willem K.B. Hofstee, *Allocation by Lot: A Conceptual and Empirical Analysis*, 29 SOC. SCI. INFO. 745, 745 (1990).

54.   *See, e.g.*, EARL L. GRINOLS, GAMBLING IN AMERICA: COSTS AND BENEFITS 17 (2004) (discussing gambling and lottery regulation).

55.   GUIDO CALABRESI & PHILIP BOBBITT, TRAGIC CHOICES 44 (1978).

56.   Samaha, *supra* note 6, *passim*.

57.   Brown, *supra* note 31, *passim* (discussing property rights in slaves).

58.   *See also* Lon L. Fuller, *The Case of the Speluncean Explorers*, 62 HARV. L. REV. 616 (1949). In this classic article, Fuller discusses the hypothetical case of five explorers trapped in a cave. *Id.* at 616. When they learn they will most likely starve to death before their rescue, they decide to kill and eat one of them, and "[a]fter much discussion of the mathematical problems involved, agreement was finally reached on a method of determining the issue by the use of the dice." *Id.* at 618. In the fictional trial that follows, the justices must decide, among other things, whether the surviving explorers' actions constituted murder, or whether the agreement among them could prevail. *Id.* at 618–19.

as economics[59] or political philosophy,[60] and some limit their analysis even more—to a narrow aspect such as social experimentation.[61] Neil Duxbury alone has attempted to provide a thorough analysis of randomization in law.[62] Although commendable, his project has not fully closed the theoretical gap and is, at any rate, rather dated. No one has furnished a comprehensive theoretical framework that systematically integrates all relevant fairness- and efficiency-oriented considerations, and applies to all legal manifestations. Non-legal scholarship on random allocations similarly tends to focus on specific concerns, such as "rent dissipation" in economics.[63] The works of Jon Elster,[64] Barbara Goodwin,[65] and Peter Stone[66] are more ambitious and potentially helpful. But even these monographs do not provide a systematic, integrative theoretical framework and, more importantly, do not use law as their focal point. This Article aims to go the extra mile.

To construct and apply the theoretical framework, the Article uses the fundamental distinction between fairness and efficiency as a cornerstone.[67] We define "efficiency" as maximizing aggregate welfare and "fairness" as compliance of the process itself or the distributive outcome with non-welfarist moral criteria. In other words, "fairness" encompasses non-welfarist perceptions of procedural and distributive justice.[68] The fairness–efficiency distinction provides a roadmap for this Article. Part I unveils the fairness of random selection as a matter of both common perceptions and normative commitments. It starts by showing that lotteries are often perceived as fair allocation methods, especially compared to the alternatives (positive fairness). Part I then examines whether the use of

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59. *See, e.g.*, Michael Abramowicz et al., *Randomizing Law*, 159 U. PA. L. REV. 929, 976 (2011) (arguing that randomizing legal rules may help evaluate policy); David Rosenberg & Steven Shavell, *A Simple Proposal to Halve Litigation Costs*, 91 VA. L. REV. 1721 *passim* (2005) (aiming to reduce litigation costs).

60. *See, e.g.*, Amar, *supra* note 28, *passim*.

61. Abramowicz et al., *supra* note 59, *passim*.

62. DUXBURY, *supra* note 16, *passim* (suggesting the use of a lottery as a decision-making tool if the adjudicator cannot make a reasoned decision by a certain point in time).

63. *See, e.g.*, Thomas W. Hazlett & Robert J. Michaels, *The Cost of Rent-Seeking: Evidence from Cellular Telephone License Lotteries*, 59 S. ECON. J. 425, 426–27 (1993) (discussing the prospect of rent dissipation); *see also* EYAL ZAMIR & BARAK MEDINA, LAW, ECONOMICS, AND MORALITY 54 (2010).

64. ELSTER, *supra* note 3.

65. BARBARA GOODWIN, JUSTICE BY LOTTERY (1992).

66. PETER STONE, THE LUCK OF THE DRAW: THE ROLE OF LOTTERIES IN DECISION MAKING (2011).

67. *See, e.g.*, George P. Fletcher, *Fairness and Utility in Tort Theory*, 85 HARV. L. REV. 537 *passim* (1972); Louis Kaplow & Steven Shavell, *Fairness Versus Welfare*, 114 HARV. L. REV. 961 *passim* (2001).

68. Gideon Keren & Karl H. Teigen, *Decisions by Coin Toss: Inappropriate but Fair*, 5 JUDGMENT & DECISION MAKING 83, 88 (2010) (making a similar distinction).

lotteries can be justified on the ground of fairness (normative fairness). It discusses the outmoded theological justification that associates random selection with divine intervention; the egalitarian argument and its limits; the fairness-related advantages and disadvantages of processual detachment from human agency; and fairness vis-à-vis people who do not take part in the primary allocation, be they allocation candidates or allocators.

Part II addresses the advantages and possible drawbacks of random selection in terms of efficiency, compared to conventional alternatives: auctions, need-based and merit-based allocations, and queues. It first examines recipients' ability, ex post, to maximize the utility of the allocated resource, as well as ex post psychological effects of the allocation method. This Part then analyzes *ex ante* changes in potential recipients' behavior created by random allocations, also noting the outcomes of the so called "insulation" from power structures facilitated by random processes. Next, Part II examines the relative advantages and shortcomings of random selection in terms of administrative costs. Finally, it discusses possible effects of random allocations on society at-large (such as political economy dynamics), and potential impact on information flow, public knowledge, and taxation policy.

The Article demonstrates that different—often conflicting—concerns may arise in different contexts. Initially, various concerns within a single rubric—be it fairness or efficiency—might be incongruent. For example, using a lottery in a particular context may increase welfare on one level but reduce it on another. In such a case, an internal balance is necessary to determine whether randomization is comparatively efficient (or fair). Moreover, fairness and efficiency may pull in opposite directions. In such a case, a value judgment is necessary.[69] The Article provides a comprehensive and a systematic framework, but its proper use by the judge, the lawmaker, and the policymaker entails a painstaking, context-specific, and value-laden analysis.

I. FAIRNESS

A. Overview

In a seminal and extremely succinct article, published in *Science Magazine* in 1970, Dael Wolfle wrote: "[W]hen the number of eligible people exceeds the number who must bear a particular burden or who can receive a particular benefit, the most democratic, equitable, and moral basis

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69. *See, e.g.*, Neil MacCormick, *Norms, Institutions, and Institutional Facts*, 17 L. & PHIL. 301, 319 (1998) (discussing cases in which "considerations of fairness take second place to considerations of efficiency").

for allocation is by chance."[70] Bruce Winick argued that in cases "involving allocation of scarce resources or government benefits, random allocation—as by lot—has been suggested as often the best or least objectionable method of allocation."[71] We shall commonly refer to these accounts as attributing fairness to lotteries. This attribution may have two dependent bases: either people perceive lotteries as a comparatively fair or unfair allocation method (the positive aspect), or lotteries are normatively fair in terms of distributive or procedural justice (the normative aspect). We will discuss the positive aspect in Subpart B, and the related normative aspect in Subpart C.

B. Positive Fairness

At the outset, we need to address a preliminary question: Why should perceptions of fairness matter in the assessment of legal principles? One possible answer is that fairness is formally defined in terms of actual perceptions.[72] That is, a principle is fair if people actually consider it so. A second possible answer involves legitimacy. The philosopher James Griffin observed: "There is no point in announcing moral restrictions unless they fit the human psyche."[73] If moral considerations aim to shape action, "they must be able to find a place inside human motivation, and, what is more, a position of authority."[74] Although Griffin discussed moral restrictions, the rationale is applicable *mutatis mutandis* to legal allocations. Any legal regime must be compatible with the most fundamental human perceptions. Otherwise it might not be endorsed by the people, and therefore lack legitimacy.[75] As one political scientist observed, "democratic institutions require certain value commitments on the part of citizens to be effective."[76] A third possible answer concerns human welfare. Perceptions of fairness matter because complying with or violating one's perception of fairness impinges on one's welfare, hence on social welfare. We shall elaborate on

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70. Wolfle, *supra* note 37, at 1201.

71. Winick, *supra* note 37, at 361.

72. *Cf.* Alan D. Miller & Ronen Perry, *The Reasonable Person*, 87 N.Y.U. L. REV. 323, 325–26, 370–71 (2012) (discussing the "positive" definition of reasonableness).

73. JAMES GRIFFIN, WELL-BEING: ITS MEANING, MEASUREMENT, AND MORAL IMPORTANCE 163 (1986).

74. *Id.*

75. *See* James L. Gibson, *Group Identities and Theories of Justice: An Experimental Investigation into the Justice and Injustice of Land Squatting in South Africa*, 70 J. POL. 700, 701 (2008) ("[I]nstitutions that rely upon principles of justice not widely shared by the citizenry are likely to have a rocky existence."); M.E. Yaari & M. Bar-Hillel, *On Dividing Justly*, 1 SOC. CHOICE & WELFARE 1, 3 (1984) ("[A] distribution mechanism [is] untenable if its prescriptions are significantly at variance with observed ethical judgments.").

76. Gibson, *supra* note 75, at 701 n.2.

this below.[77] A fourth answer, which links this Subpart to the next, is that positive perceptions of fairness often reflect defensible normative accounts of fairness. The fact that people consider a certain principle fair provides prima facie evidence that this principle is defensible in terms of normative fairness. In sum, actual perceptions of fairness are significant not only for understanding, but also for defending and justifying legal regimes. Thus, an important component of any justification for an allocation method is compliance with positive perceptions of fairness.

The first study on the perceived fairness of random allocations was conducted in the late 1970s. Wortman and Rabinowitz carried out an experiment with hundreds of undergraduate psychology students, comparing their perceptions of four methods—merit-based; need-based; first come, first served (or FIFO); and random selection—of allocating a scarce good, namely an attractive educational program.[78] Random assignment was considered the fairest method; it was even deemed fair by students whose applications for the program were unsuccessful, while students' perceptions of the fairness of other methods depended on the personal outcome.[79] So according to this study, random allocation is not only perceived as the fairest method, but also overcomes self-interest biases related to other methods. However, subsequent studies have challenged and qualified these preliminary findings.

Erez surveyed inmates' attitudes to various methods of allocating a limited number of slots in a prison educational program.[80] A random sample of 348 inmates incarcerated in three federal institutions was selected to participate in the study.[81] Respondents were asked to select the fairest among four allocation methods presented to them—random selection, need-based, merit-based, and FIFO—and to assess each method's fairness.[82] Need-based allocation was deemed fairest by the largest number of inmates, followed by merit-based allocation, FIFO, and lastly random assignment.[83] The average assessments of fairness of these methods were in the same order.[84] A possible explanation for the difference between the

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77. *See infra* Subpart II.B.2.

78. Camille B. Wortman & Vita C. Rabinowitz, *Random Assignment: The Fairest of Them All*, 4 EVALUATION STUD. REV. ANN. 177 (1979). Different groups of students were told different stories about which criterion had been used to make the selection, and whether they individually had been successful. All were asked which selection criterion was fairest. *See also* LYN CARSON & BRIAN MARTIN, RANDOM SELECTION IN POLITICS 36–37 (1999) (discussing Wortman & Rabinowitz).

79. Wortman & Rabinowitz, *supra* note 78, at 182–83.

80. Edna Erez, *Random Assignment, the Least Fair of Them All: Prisoners' Attitudes Toward Various Criteria of Selection*, 23 CRIMINOLOGY 365 (1985).

81. *Id.* at 368.

82. *Id.*

83. *Id.* at 370–71, 375, 377.

84. *Id.* at 372, 375, 377.

findings of Erez and of Wortman and Rabinowitz is the participants' level of education. Inmates who had at least some college education and exposure to the meaning and consequences of randomization selected this method as the fairest more frequently than they endorsed need; they also ranked need significantly lower than did inmates who had no college education.[85]

Frey and Pommerhene surveyed reactions to different methods for allocating a vital resource—water bottles—in a situation of excess demand.[86] They found that random allocations were deemed fair by only 14% of respondents, compared to 27% for a price increase, 43% for administrative judgment, and 76% for FIFO.[87] Based on these findings the authors concluded: "The low evaluation of the random mechanism[] may be due to the fact that it is not widely known, and not considered suitable for 'serious matters', such as the allocation of water."[88] When they replaced water bottles with shovels, random allocation was still deemed fair by a smaller proportion of respondents (27%) than FIFO (93%) and administrative judgments (48%).[89] However, this study suffered from a methodological flaw. It presented the random process as follows: "Selling the [scarce resource at the normal price] following a random procedure (e.g. to give to all persons whose surname starts with A through to P)."[90] The example given for random allocation was not truly a random process in the particular context (even in the epistemic sense), but rather an arbitrary method. Chances of acquiring the resource were not equal for all participants, but predetermined by their surname.[91]

Oberholzer-Gee and others found that for important problems, including the siting of nuclear waste repositories, lotteries are not deemed fair.[92] The study was based on a survey of more than 500 respondents, representing the general population of Switzerland. To select a nuclear waste site out of those that were geologically and technically feasible,[93] the respondents were asked to evaluate six allocation methods: (1) approval by the host community and the host canton following a safety inspection (i.e., the community and the canton have veto rights); (2) negotiations between the government and the candidates until voluntary acceptance; (3) a

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85. *Id.* at 375.

86. Bruno S. Frey & Werner W. Pommerehne, *On the Fairness of Pricing – An Empirical Survey among the General Population*, 20 J. ECON. BEHAV. & ORG. 295 (1993).

87. *Id.* at 301–02.

88. *Id.* at 302.

89. *Id.* (price increase was deemed fair by 23%).

90. *Id.* at 301.

91. For example, a person named Ronen Perry would definitely obtain a water bottle, whereas a person named Tal Zarsky would not.

92. Oberholzer-Gee et al., *supra* note 45, at 90–91.

93. *Id.* at 92–93.

decision by foreign experts; (4) a national referendum; (5) an equal-chance lottery; (6) one of two price-based methods: willingness to accept (offering a generous compensation to the community who agrees to bear the burden), and willingness to pay (the community less willing to pay bears the burden). Unsurprisingly, approval and negotiations were deemed most "acceptable," followed by a foreign (presumably unbiased) expert decision, referendum, lottery, willingness to accept, and willingness to pay.[94] The most decisive variables affecting "acceptability" were fairness and safety, so the ranking of the methods by "fairness" was identical to the above.[95] This study should be cautiously interpreted. Consent-based and consensus-based allocation methods (1, 2, 4) are preferred on both fairness and efficiency grounds, but the law often needs to allocate resources in the absence of consent. Independent experts may be preferable when a decision on the merits is possible, but often it is not (and therefore a lottery is used). The study does show, however, that in the absence of consent, a random allocation may be preferred to price-based methods.

More recently, Keren and Teigen conducted a series of experiments, examining people's attitudes to random selection.[96] They showed that people were not keen to decide by a coin flip which of two individuals, with equally strong claims, to save from certain death.[97] However, this finding should be qualified on three levels. First, throughout the paper, random selection was not properly compared to alternative selection methods, but to allocative outcomes. The paper does not explicitly discuss or propose alternative criteria, such as merit, need, willingness to pay, or temporal advantage. Indeed, when the authors asked subjects to consider whether better methods existed (without naming possible alternatives), their support for a coin flip increased.[98] Second, the authors found that any aversion to the use of a coin flip diminished dramatically when the stakes were lower;[99] when the inability to make a decision on the merits was emphasized;[100] when subjects were asked to consider whether better decision methods existed;[101] and when the decision maker was biased.[102] Third, the study showed that the aversion did not apply to "random devices" or "giving [each participant] an equal chance," which were

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94. *Id.* at 93–94.

95. *Id.* at 94–95; *see also id.* at 92 (discussing a study by Linnerooth-Bayer and others, in which 62% of all survey respondents rejected as "unfair" the selection of a "noxious facilities" site among equally appropriate sites by lot).

96. Keren & Teigen, *supra* note 68, at 83.

97. *Id.* at 86–89.

98. *Id.* at 91–93.

99. *Id.* at 89–90.

100. *Id.* at 91–93.

101. *Id.*

102. *Id.* at 96–97.

approved by the vast majority of subjects,[103] but to coin flips, as a concretization of the abstract notion of fairness through equiprobability.[104]

One may expect lotteries to be deemed fair when the allocator is unable to decide on the basis of a substantive criterion, such as need or merit. However, there is some evidence that even where a substantive criterion is workable, people consider some reliance on chance fair. A weighted lottery is an allocation method in which every candidate has an opportunity to obtain the resource through a lottery, but a substantive criterion, such as need or merit, is used to determine each person's stake. Not surprisingly, when asked to evaluate university admission methods in the Netherlands, weaker applicants (based on their secondary-school grades) preferred an equal-opportunity lottery, whereas stronger applicants preferred a merit-based method.[105] Interestingly, however, the percentage of students who preferred a weighted lottery that combined chance with merit increased as secondary-school grades were higher.[106] This implies that even in heterogeneous groups, people want the process to be sensitive to merit, but not exclusively—so that even the least meritorious will have a chance of obtaining the resource.[107]

C. Normative Fairness

1. The Theological Argument

In ancient societies lotteries were frequently used as decision-making devices, on the assumption that their outcomes reflected the will of the gods.[108] This perception may be traced back at least to the ninth century BC.[109] Most notably, the notion that the outcomes of lotteries served as the tangible expression of the will of the Judeo–Christian God has numerous manifestations in the Bible. The book of Proverbs explains the link between the result of casting lots and divinity: "The lot is cast into the lap; but the whole disposing thereof is of the Lord."[110] At times, lotteries were used to detect the perpetrator of an offense. Joshua found the person who pillaged Jericho (Achan) through cleromancy;[111] King Saul determined by the same means that his son Jonathan had broken the oath not to eat during

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103. *Id.* at 94–95.
104. *Id.* at 95–96.
105. ELSTER, *supra* note 3, at 47–48.
106. *Id.* at 48–49.
107. *Id.* at 49.
108. DUXBURY, *supra* note 16, at 18; ELSTER, *supra* note 3, at 50; Fienberg, *supra* note 8, at 255.
109. DUXBURY, *supra* note 16, at 16–17.
110. *Proverbs* 16:33.
111. *Joshua* 7:14–18.

one of the wars against the Philistines;[112] and Jonah was chosen by lot to be thrown from the ship to appease God.[113] In other cases lotteries were used to allocate resources such as land[114] without explicit reference to God's will, although the theological rationale for using a lottery was implicit. In the New Testament, Matthias was chosen to replace Judas as the twelfth apostle, following his betrayal of Jesus, by casting lots, with the intent to reveal God's choice.[115] In at least one case, casting lots was considered a fulfillment of prophecy. The soldiers who crucified Jesus could not divide his robe because it was "without seam, woven from the top throughout," so they decided "not [to] rend it, but cast lots for it, whose it shall be,"[116] fulfilling the prophecy in Psalms.[117]

The linkage between lotteries and divine intervention also found its way into the common law. For example, in the renowned nineteenth-century case of *United States v. Holmes*,[118] the court explained that under the law of the sea, when sacrificing one person aboard a ship is required to satisfy others' hunger, that person is selected by lot.[119] In the court's view, this method is considered "in some sort, as an appeal to God, for selection of the victim."[120] A few decades earlier, in *The Antelope*,[121] the Sixth Circuit Court of Appeals decided to divide African slaves between Spanish and Portuguese claimants by lot.[122] It explained that "the Almighty will direct the hand that acts in the selection."[123] Lotteries may be more easily accepted as decision-making mechanisms when they can be interpreted as an expression of divine preferences.[124] For a believer in God, casting lots is normatively fair because its outcome is consistent with God's will, and therefore inherently good. If God's choice is good, and the lottery divulges God's choice, no additional justification is needed for the use of lotteries.

Three comments on this perception are in order. First, according to Christian theology, lotteries should be used sparingly, to decide serious rather than trivial matters. Accordingly, God should not be troubled with inconsequential decisions. Thomas Aquinas held that only in cases of "urgent necessity it is lawful, provided due reverence be observed, to call

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112. 1 *Samuel* 14:40–42.
113. *Jonah* 1:6–7.
114. *Numbers* 26:52–56, 33:54; *Joshua* 18:2–10.
115. *Acts* 1:21–26.
116. *John* 19:23–24.
117. *Psalms* 22:18.
118. 26 F. Cas. 360 (Pa. Cir. Ct. 1842).
119. *Id*. at 367.
120. *Id.*
121. 23 U.S. 66 (1825).
122. Brown, *supra* note 31, at 83–84 (quoting the unpublished decision).
123. *Id.* at 84.
124. ELSTER, *supra* note 3, at 104.

upon God for a judgment by casting lots."[125] Thomas Gataker was even stricter, asserting that the use of lotteries to reveal God's will was permitted only when commanded by God.[126] Thus, games of chance were prohibited or discouraged in Christendom not only because of the evils associated with gambling,[127] but also because they were blasphemous in summoning divine intervention in matters of no consequence.[128]

Second, to the extent that lotteries reveal God's will, fairness does not mandate equiprobability because God presumably ensures that the "proper" persons or objects are selected, irrespective of the objective probabilities.[129] However, even at times when lotteries were perceived as a means to unveil God's will, with the underlying assumption that God would always ensure proper selection, people still cared deeply about the intricacies of the procedure, which influenced objective probabilities.[130] This indicates some lack of trust in God's intervention, hence an ambiguous attitude to the theological rationale for casting lots.[131]

Third, the view that casting lots can divulge God's will was contested from the early seventeenth century,[132] and by its end, separating chance from divine providence had become the norm.[133] Put differently, while the theological explanation for the fairness of lotteries had reigned for centuries, and perhaps survived to some extent in the common law through the nineteenth century, it is not considered valid by modern moral and political philosophers. To the extent that some people still believe that random selection reflects divine will, casting lots may have the same benefits of adhering to positive perceptions of fairness, as discussed above.

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125.   THOMAS AQUINAS, SUMMA THEOLOGIAE, II–II, Q. 95, art. 8 (T.F. O'Meara & M.J. Duffy eds., Cambridge Univ. Press 2006).

126.   THOMAS GATAKER, OF THE NATURE AND USE OF LOTS: A TREATISE HISTORICALL AND THEOLOGICALL 14–25 (1st ed. 1619).

127.   For example, the UK Gaming Act of 1845 made all contracts "by way of gaming or wagering" void and unenforceable; one of the policy reasons underlying this rule was the paternalistic concern that people would over-commit themselves through gambling debts. RICHARD STONE, THE MODERN LAW OF CONTRACT 373–74 (6th ed. 2005); *see also* GRINOLS, *supra* note 54, at 131–74 (discussing the vices of gambling).

128.   DUXBURY, *supra* note 16, at 19.

129.   ELSTER, *supra* note 3, at 51.

130.   *Id.*

131.   *Id.*

132.   DUXBURY, *supra* note 16, at 20–21.

133.   *Id.* at 21–22.

2. *Equality*

a. *Randomization as an Egalitarian Method*

The strongest fairness-based normative justification for casting lots derives from the notion of egalitarianism. In hierarchical societies people are treated according to their relative rank:[134] higher ranked individuals receive preferential treatment, and vice versa. But as legal philosopher Neil MacCormick stated, in modern egalitarian societies "the provision of a service or opportunity should be based on some ground that is universalistic rather than personally discriminatory."[135] The understanding that randomization may be justified as an attempt to secure equality is time-honored. Most notably, administrative officials in ancient Athens were selected by lot, a practice that "was a public expression of democracy's commitment to the equality of all citizens."[136] The structure of the egalitarian justification (or more accurately, set of justifications) is this: participants are equal,[137] so they should be treated equally,[138] and lotteries treat them equally.[139] A concrete example can be found in President Lyndon Johnson's special message to Congress on the selective draft of 1970: "Assuming that all men available are equally qualified and eligible . . . the only method which approaches complete fairness is to establish a Fair And Impartial Random (FAIR) system of selection . . . ."[140] If one endorses the notion that equals should be treated equally, two substantive questions arise: In what sense are participants equal, so that they ought to be treated equally? In what sense do lotteries treat equals equally?

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134. *See* EDWARD T. HALL, THE SILENT LANGUAGE 158 (1959) ("[W]here society assigns rank for certain purposes . . . the handling of space will reflect this.").

135. MacCormick, *supra* note 69, at 307.

136.   Richard G. Mulgan, *Lot as a Democratic Device of Selection*, 46 REV. POL. 539, 546 (1984); *see also* DUXBURY, *supra* note 16, at 28–29, 34–35 (explaining that in ancient Athens, election by lot was based on the idea of equality of opportunity).

137. *See* ELSTER, *supra* note 3, at 67, 75, 107 ("[The] candidates . . . are equally and maximally good."); Kornhauser & Sager, *supra* note 9, at 492 ("claimant pool composed of persons who enjoy equal moral entitlement to the good").

138. *See* ELSTER, *supra* note 3, at 113 ("Fairness . . . means simply that relevantly like cases should be treated alike.").

139. *See id*. at 38 ("In the absence of reasons for choosing one alternative, one candidate, one recipient or one victim rather than another, we might as well select one at random."); GOODWIN, *supra* note 65, at 45–46 (explaining that lotteries treat people equally); George Sher, *What Makes a Lottery Fair?*, 14 NOÛS 203, 203 (1980) ("[W]hen two or more people have equal claims to a good that cannot be divided . . . the morally preferable way of allocating that good is through a tie-breaking device, or *lottery*, which is fair.").

140. Fienberg, *supra* note 8, at 256.

The plain answer to the first question is that equality is based on the absence of differences which are considered relevant to the allocation.[141] Arguably, people should not be discriminated against on the basis of race, religion, ethnicity, gender, sexual orientation, appearance, age, political orientation, socioeconomic status, or any other trait deemed irrelevant for purpose of the particular allocation, a certain type of allocation, or all allocations.[142] The most extreme version is that equality is based on personhood itself, rather than any personal trait,[143] so all interpersonal differences must be ignored. Whenever relevant differences exist among people, an egalitarian method would either employ a preliminary screening process to separate those eligible from those ineligible to participate in the allocation, or to somehow integrate the relative strengths of the various claims into the allocation process. We will elaborate on this below.

As for the second question, we argue that lotteries do treat participants equally. To begin with, when all people are deemed equal based on personhood, or when some people are deemed equal because they have passed a certain eligibility threshold, a random-based allocation method treats such people equally. It does so in the sense that it is completely blind to all interpersonal differences among them: "None of the personal characteristics that typically interfere with decision processes in a completely unwarranted way enter procedures based on chance."[144] This feature is reminiscent of the Rawlsian "veil of ignorance."[145] According to John Rawls, justice is manifested in the principles that rational individuals would select behind a veil of ignorance, namely deprived of all knowledge of their tastes, talents, social positions, and so forth.[146] While Rawls used this notion to discuss the fairness of allocation outcomes, it may also be applicable to procedures. Presumably, people behind a veil of ignorance

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141. *See, e.g.*, DUXBURY, *supra* note 16, at 62 (explaining that if candidates appear equally entitled (based on skill, merit, need, etc.), random allocation might be deemed fair); ELSTER, *supra* note 3, at 113 ("[W]hen there are no relevant differences among candidates . . . one should use a lottery since the alternative (i.e., using irrelevant differences) would be unfair."); George I. Mavrodes, *Choice and Chance in the Allocation of Medical Resources: A Response to Kilner*, 12 J. RELIGIOUS ETHICS 97, 99 (1984) (explaining that a random allocation may be defensible where "there are no *morally relevant* differences among the 'candidates.'"); Winick, *supra* note 37, at 361 (explaining that randomization may be deemed fair where "individual differences seem ethically irrelevant to the making of such choices").

142. *Cf.* HALL, *supra* note 134, at 158 ("[I]t is regarded as a democratic virtue for people to be served without reference to the rank they hold in their occupational group. The rich and poor alike are accorded equal opportunity to buy . . . in the order of arrival.").

143. *See* DUXBURY, *supra* note 16, at 52 (discussing equality based on personhood); Kornhauser & Sager, *supra* note 9, at 499 (same).

144. Oberholzer-Gee et al., *supra* note 45, at 89 (noting specifically the exclusion of nepotism, favoritism for the rich and powerful, etc.); *see also* GOODWIN, *supra* note 65, at 45–46 (discussing the impartiality of lotteries).

145. JOHN RAWLS, A THEORY OF JUSTICE 136 (1971).

146. *Id.* at 136–42.

would select an allocation procedure that ignores irrelevant personal traits.[147]

In being blind to irrelevant criteria, lotteries are similar to other allocation methods, most notably FIFO (queues).[148] Still, lotteries may be preferable to other egalitarian allocation methods because they are wholly, not just partially, indifferent to personal characteristics. FIFO, for example, is sensitive to the subjective desire and ability to acquire and maintain a temporal advantage. This in turn may correlate with normatively irrelevant characteristics that lotteries ignore, such as wealth and social status. On the other hand, a temporal advantage may correlate with relevant characteristics, such as need or skill,[149] which random-based allocations disregard, as we explain below. Most interestingly, in some cases the order of joining a queue is coincidental, making FIFO a random-based allocation method (a "natural lottery" so to speak). This important insight can be dated back to Thomas Hobbes in *Leviathan*.[150] Hobbes maintained that when a resource cannot be divided or enjoyed in common, equality requires allocation by lot.[151] He then explained that lotteries can be natural in cases of "Primogeniture, (which the Greek calls Κληρονομια, which signifies, Given by Lot;) or First Seisure."[152] In other words, a FIFO allocation (first possession or first birth) may essentially be random.[153] A modern example would be a hospital treating accident victims on a FIFO basis, where their order of entry is essentially determined randomly.[154]

A random-based allocation method distributes equal benefits or burdens, but in a unique manner. If participants are equal in all relevant respects, the most obvious allocation method would distribute equal shares of the resource to all participants. The problem is that in most cases the number of shares to which the resource can be divided is smaller than the number of people wishing to obtain a share.[155] Divisibility may be

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147. John Rawls, *Outline of a Decision Procedure for Ethics*, 60 PHIL. REV. 177, 193 (1951) ("Imagine a good of such a nature that it is impractical or impossible to divide it, and yet each of a number of persons has an equally strong claim on its possession or exercise. In such a case we would be directed to select one claim as meriting satisfaction by an impartially arbitrary method, e.g., by seeing who draws the highest card.").

148. *See* Perry & Zarsky, *supra* note 7, 14–16 (discussing queues' neutrality).

149. *Id.* at 29–31.

150. THOMAS HOBBES, LEVIATHAN 108 (Richard Tuck ed., Cambridge Univ. Press 1991).

151. *Id.*

152. *Id.* (emphasis omitted).

153. *Id.* ("[T]hings which cannot be enjoyed in common, nor divided, ought to be adjudged to the First Possessor; and in some cases to the First-Borne, as acquired by Lot.").

154. *See* DUXBURY, *supra* note 16, at 147 (discussing this case); ELSTER, *supra* note 3, at 71 (same).

155. *See* Kornhauser & Sager, *supra* note 9, at 492 (explaining that lotteries may be justified only where "there is not enough of the good [and] . . . scarcity prevents a full and equal allocation of the good among the claimant pool").

physically impossible or unwarranted, for example, when further division results in significant reduction in aggregate value. When equal shares cannot be allocated due to divisibility constraints, lotteries provide what seems to be a second-best solution—equal opportunities,[156] hence equal expectations.[157] Put differently, where it is impractical to divide the goods equally among those who desire them, a lottery serves to satisfy the requirement that the process be fair in terms of equal treatment.[158] Equal opportunity is the normatively defended principle,[159] assuming that non-allocation is not a preferable option.[160] Indeed, this normative commitment may underlie people's perception of the lottery as a fair allocation method. An empirical study found that the most frequent explanation for preferring random allocation "involved some statement about the importance of equal chance for every [candidate] to participate or benefit."[161]

b. *An Inevitable Extension*

In many cases participants differ in relevant respects, but distinguishing among them is impractical or impossible. In one category of cases, the allocator cannot determine whether or not participants have a relevant characteristic, meet a certain requirement, etc. A good example is random inspection of baggage at the border, where only a given portion of all passengers can be inspected, and it is impossible to know, prior to selecting whom to inspect, who violates the law or poses a risk.[162] In a second category of cases, the allocator knows that participants differ in relevant respects, but the relevant qualities are incommensurable, so the allocator cannot determine who is more worthy overall, namely when all qualities

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156.   DUXBURY, *supra* note 16, at 61; Bolton et al., *supra* note 21, at 1055 ("[R]andom lotteries . . . [are] used to distribute goods or obligations for which equal division among all participants is not practicable."); Fienberg, *supra* note 8, at 256 ("[R]andom selection allows each individual the same chance of attaining that position or being selected for that duty."); Greely, *supra* note 10, at 122 ("Where equality of result is impossible . . . equality of opportunity is the next best goal because it parcels out equal chances to receive the good."); Kornhauser & Sager, *supra* note 9, at 496, 499 ("[I]nstead of getting one unit of the good each member of the lottery pool gets [an equal] chance at one unit of the good . . . . The lottery . . . divides the scarce good into probabilistically equal units.").

157.   Greely, *supra* note 10, at 122 ("Random selection is the only allocative method which honestly can claim the objective equality of opportunity from which the satisfaction of equality of expectation springs.").

158.   Boyce, *supra* note 24, at 457.

159.   *See* Bolton et al., *supra* note 21, at 1054 ("[P]rocedures deemed fair are typically those that create a 'level playing field', a place where the participants have equal opportunity even if the resulting allocation is not equal.").

160.   Kornhauser & Sager, *supra* note 9, at 496.

161.   Erez, *supra* note 80, at 372.

162.   *See* Oberholzer-Gee et al., *supra* note 45, at 96 (discussing this case).

are taken into account.[163] This is a conceptual impossibility that cannot be overcome simply by exerting more effort. Take, for example, laying off employees in a system that aims to respect both seniority and affirmative action; the allocator may be unable to compare people based on an aggregate of the two qualities.[164] In a third category of cases, the allocator knows that participants differ in a relevant respect, and the differences are commensurable, but because they are so small a human decision maker is unable credibly to evaluate them.[165] This impossibility derives from the limits of human perceptiveness. In the fourth and last category of cases, the allocator knows that participants differ, the relevant qualities are commensurable, but the differences are small and evaluating them is simply too costly (in terms of time, effort, or wealth).[166]

   In the first three categories, the allocator is unable to determine relative worthiness under substantive criteria (such as need or merit). Therefore, the law may consider all participants equal, making lotteries a defensible allocation method on egalitarian grounds. With respect to the fourth category (differentiation is too costly), we admittedly mix the egalitarian argument with efficiency, realizing that the benefits in terms of fairness of a fine-tuned application of substantive allocation criteria are too small to justify such a significant waste of resources. This is an efficiency-based constraint on the margin of fairness. These conclusions are subject to constitutional constraints—in particular where civil rights and liberties are at stake. For example, with respect to the first category, the Fourth Amendment may limit the use of lotteries in law enforcement. The Supreme Court held in *Delaware v. Prouse*[167] that when there is no reasonable suspicion that a driver is unlicensed or that the vehicle is unregistered (a first category case), there is no legitimate basis for stopping one but not the other, making random selection unconstitutional.[168] Of course, this decision pertains to a very specific criminal procedure issue.

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   163.   *See* ELSTER, *supra* note 3, at 109 (discussing this case); Samaha, *supra* note 6, at 20 ("[A] decision maker might be unable to rank . . . options [which] differ along sufficiently different dimensions.").
   164.   Greely, *supra* note 10, at 123–25.
   165.   *See* ELSTER, *supra* note 3, at 74 ("[W]e would often find it impossible in practice to carry out finely grained comparisons of needs.").
   166.   *See id*. at 75, 107 ("Costs of decision might make it pointless to use very fine tuned methods of screening . . . . [and t]he costs of fine-tuned screening . . . may be prohibitively high."); Samaha, *supra* note 6, at 20 ("Key information can be too costly to be worth acquiring or impossible to obtain . . . .").
   167.   440 U.S. 648 (1979).
   168.   *Id.* at 660–61 (holding this practice unconstitutional under the Fourth Amendment).

c. Caveats

The egalitarian argument raises four problems. First, while lotteries are blind to irrelevant interpersonal differences, they are also insensitive to morally and legally relevant criteria, such as personal need, merit, or competence.[169] From an equality perspective, people should be treated equally unless there is a special reason relevant to the allocation to treat one or more of them unequally.[170] Lotteries may be fair if allocation participants are indistinguishable in all relevant respects. If this assumption is proven false, casting lots may be deemed capricious or arbitrary,[171] as it would deny benefits from the most deserving or impose burdens on the least deserving.[172] For example, randomly selecting a person for a public office means we do not select the most meritorious and skillful person for the job.[173] Similarly, randomized military drafts do not select those who have the greatest desire or skills to be soldiers.[174] Finally, as the Supreme Court held in *Grutter v. Bollinger*,[175] using a lottery-based law school admissions system to secure race neutrality would make nuanced judgments concerning admissions impossible, and "would effectively sacrifice all other educational values, not to mention every other kind of diversity."[176] If people vary in a relevant sense, lotteries cannot be justified in terms of equality. Of course, deciding whether variance in a particular aspect is relevant to a specific allocation is in itself a political matter, which we will address below. Thus, if we believe selection for military service should not be associated with personal desire or skill, randomization may be defensible on fairness grounds. At any rate, if most participants are indistinguishable, and only a relatively few differ, a chance-based system with exceptions may be defensible.

Second, because the egalitarian case for lotteries assumes that participants are roughly equal in all relevant respects, employing a random-based allocation method usually requires some preliminary screening (eligibility requirements).[177] Only when "a number of people fulfill all the requirements of, or qualifications for, a particular position or duty, the

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169. *See* DUXBURY, *supra* note 16, at 15, 51, 86 (explaining that lotteries ignore need, competence/talent/skill, and merit); GOODWIN, *supra* note 65, at 46–47 (same); Brown, *supra* note 31, at 73, 93, 99 (same); Erez, *supra* note 80, at 366, 373 (same); Wolfle, *supra* note 37, at 1201 (same).

170. *See* D. Daiches Raphael, *Equality and Equity*, 21 PHIL. 118, 120–22 (1946) (explaining that exceptions to equality must derive from relevant reasons).

171. Erez, *supra* note 80, at 366.

172. DUXBURY, *supra* note 16, at 87.

173. *Id.* at 34.

174. *Id.* at 86, 156.

175. 539 U.S. 306 (2003).

176. *Id.* at 340.

177. *See supra* note 18 and accompanying text.

notion of a lottery or random selection" may be used.[178] For instance, selection by lot among public housing applicants is justifiable only if they are equally qualified under some standard of neediness.[179] This means that lotteries are preceded by non-random political decisions with significant distributional effects.[180] The risk is obvious: Although random allocation seems to secure equality, the seemingly egalitarian process disguises pre-allocation decisions which may be non-transparently discriminatory.[181] Casting lots may also mask a preliminary decision to produce less than the necessary amount of a resource, attributing to pure luck the fact that some people in need do not get it.[182] These problems may be mitigated through vigorous public debate. Still, in considering the fairness of random allocations one must always be aware of the existence and nature of the pre-allocation screening. A lottery can be fair in egalitarian terms only if the eligibility requirements are based on criteria which are morally defensible and relevant for the allocation.

Instead of screening, the allocator can employ a weighted-lottery model. This too involves a preliminary stage based on a substantive criterion, in which candidates' relative worthiness rather than eligibility is determined. In the second random-based stage, candidates do not have equal odds of being selected, but an adjusted probability, correlated with their relative worthiness. This model can be employed where the group of candidates is heterogeneous in a relevant aspect, but the allocator wants to give each of them a chance. Here too, political considerations blend in, though more overtly. It is important to verify that the substantive criteria incorporated into the process are relevant and morally defensible, and that the assigned weights are reasonable.

Third, while lotteries are formally blind to irrelevant criteria, their application may be sensitive to power structures in society. In other words, they can be gamed or circumvented. *Ex ante*, namely prior to the allocation, an affluent pursuer can employ several people to participate independently in the lottery on his or her behalf, or purchase more participation rights, thereby increasing his or her chance of winning. *Ex post*, namely after the

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178. Fienberg, *supra* note 8, at 256; *see also* ELSTER, *supra* note 3, at 67, 75, 107 (explaining that random selection is residual).

179. Holmes v. New York City Hous. Auth., 398 F.2d 262 (2d Cir. 1968).

180. Brown, *supra* note 31, at 93, 98.

181. *Id.* at 73; *see also* Pauline T. Kim, *The Colorblind Lottery*, 72 FORDHAM L. REV. 9, 12 (2003) ("[T]his focus masks the substantive choices that determine who is, and who is not, given a chance to participate.").

182. Brown, *supra* note 31, at 94, 99. *But cf. infra* Subpart II.E.1 (arguing that randomization may increase the extent of the allocated resource).

allocation, the well-off can purchase the resource at a higher price from speculators or from others who acquired the resource through the lottery.[183]

Admittedly, this type of problem characterizes other allocation methods as well. The *ex ante* problems are method-specific. Lotteries are less prone to pre-allocation manipulation by the powerful than other methods. For instance, in FIFO-based allocations affluent participants may have more opportunities to obtain priority. They may use their resources to secure early entry, pay other queuers to cut in, employ agents to enter the queue and obtain the resource on their behalf, or hire people to serve as placeholders for a while. In lotteries, on the other hand, the ability to use wealth to secure pre-allocation advantages is more limited, though it may still exist. The problem of *ex ante* tilt in favor of the powerful is not only less acute in lotteries than in other allocation methods, but can also be effectively alleviated. The allocator can enforce a "one ticket per person" rule and verify that only those actually participating in the lottery obtain and utilize the resource. The *ex post* problem, to the extent that it is considered a problem, is shared by all allocation methods and is not unique to lotteries. Post-allocation transfers can be prevented, as in non-random allocations, by imposing restrictions on acquiring-by-proxy and on secondary market transactions (alienability).[184] We will briefly address these concerns in the Conclusion.

The fourth caveat challenges the normative value of a mere opportunity to receive a resource. While the idea that providing equal chance satisfies the requirement of equality is well established, it may be challenged on the ground that what makes an allocation method fair is the outcome, and in this respect a person who acquires a non-materialized chance acquires nothing. David Wasserman observed that "the value conferred by the probabilistic shares in a lottery is shared only briefly before passing to a single claimant."[185] One possible response is that an opportunity in itself has value, as the purchase of lottery tickets demonstrates. An alternative response concedes that lotteries do not secure substantive distributive justice but procedural justice, namely equal treatment through the process.[186] A third response—the least compelling—is that, theoretically, a consistent use of lotteries for all allocations over time will result in equal

183.   *Cf.* Leon Mann, *Queue Culture: The Waiting Line as a Social System*, 75 AM. J. SOC. 340, 353 (1969) (discussing privileged classes' ability to circumvent queues).

184.   *See* Stephen K. Happel & Marianne M. Jennings, *Creating a Futures Market for Major Event Tickets: Problems and Prospects*, 21 CATO J. 443, 445–47 (2002) (discussing anti-scalping laws).

185.   David Wasserman, *Let Them Eat Chances: Probability and Distributive Justice*, 12 ECON. & PHIL. 29, 44 (1996).

186.   There is probably some relation between the two, as people's satisfaction with a decision-making process may increase their satisfaction with its outcome.

distribution of benefits and burdens.[187] Put differently, if all resources and burdens are allocated randomly, people are expected to end up with an equal material share in the long run. However, consistent use of lotteries is not only unlikely but also unwarranted, because in many cases other allocation methods are more appropriate.

3. Detachment from Human Agency

a. Advantages

Another set of normative justifications for casting lots hinges on the detachment of random selection from human agency.[188] While this characteristic affords several benefits on the efficiency level, it also carries some advantages from a fairness perspective. To begin with, isolation of the process from human agency prevents any allocative unfairness that may ensue from improper exercise of discretion. This argument has two components: (1) allocations involving discretion and human judgment may be exposed to unconscious biases, prejudice,[189] external pressures by strong participants, and sometimes even abuse[190] or corruption;[191] and (2) random allocation does not involve human discretion and judgment[192] and is therefore immune to the above.[193] Admittedly, the exercise of human discretion may be required to achieve important social goals. However, to the extent a case exists for implementing a random-based allocation method, this advantage must also be borne in mind in a comprehensive analysis. Although this Part focuses on fairness, not welfare maximization, we note for completeness that by preventing improper exercise of discretion, randomization also eliminates any perceptions of bias,

187. GOODWIN, *supra* note 65, at 45–46.

188. *See* DUXBURY, *supra* note 16, at 13 ("[Lotteries] are stripped of human agency . . . .").

189. *See* Tal Z. Zarsky, *Governmental Data Mining and Its Alternatives*, 116 PENN. ST. L. REV. 285, 310 (2011) ("[R]elying upon human discretion allows for the internal biases of the individual decision-makers to impact their actions and decisions . . . .").

190. DUXBURY, *supra* note 16, at 52.

191. GOODWIN, *supra* note 65, at 45–46.

192. *See* Erez, *supra* note 80, at 372, 375 ("[Lotteries] do[] not require human judgment . . . . [and] no discretion is involved.") (internal quotation marks omitted).

193. *See, e.g.*, DUXBURY, *supra* note 16, at 52 (explaining that lotteries prevent abuse); GOODWIN, *supra* note 65, at 45–46 (explaining that lotteries prevent corruption); Erez, *supra* note 80, at 372 ("[Lotteries] eliminate any bias, prejudice, or racial overtones in the selection, [and] it is the only one that does not require human judgment, allowing biases to enter the picture . . . .") (internal quotation marks omitted); Greely, *supra* note 10, at 118 (explaining that lotteries prevent unintentional inclusion of irrelevant criteria).

corruption, or incompetence that may cause participants discontent (and loss of welfare).[194]

The fact that random selection is detached from human agency may also help avoid unfair secondary allocations. If a resource is allocated on the basis of need, merit, skill, or willingness to pay, the initial allocation of the resource yields a secondary allocation of self-esteem and social admiration. Those who obtain a share may have reason to boast and receive accolades, and those who are denied a share may lose self-esteem and be stigmatized. To be rejected by fortune is less detrimental to self-esteem,[195] and less dishonorable and stigmatizing, than to be rejected by the community.[196] Similarly, gaining a resource through mere luck, without human choice, provides no reason for boasting or praise.[197] Therefore, lotteries may have an additional advantage if we believe that a secondary allocation of self-esteem and social regard is unfair.[198]

Finally, in some cases, deciding how to allocate a resource is an extremely thorny task, to the extent that no one has the will and capacity to decide. One example would be decisions in matters of life and death, such as selective military drafts and allocation of scarce medical resources. Another would be decisions involving a conflict between two or more equally legitimate policies,[199] where a reasoned decision inevitably requires subordinating one policy to another.[200] A person required to make a reasoned decision in those cases may be burdened twice. *Ex ante*, he or she must make an extremely tough decision that no one truly wants to make and is capable of making about the relative worthiness of candidates. *Ex post*, he or she may be blamed by disgruntled participants for the outcome, or feel guilty about it even in the absence of such a complaint. Unless someone wants or is obliged to make a reasoned decision, it may be unfair to impose this burden on anyone. Randomization exempts all people from making the difficult decision,[201] and curtails an attribution of blame or a feeling of guilt.[202] Of course, discontented participants may blame the

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194.   DUXBURY, *supra* note 16, at 13 (noting that no discretion may prevent a sense of unfairness); ELSTER, *supra* note 3, at 105 (same); Greely, *supra* note 10, at 120 (same); *see also infra* Subpart II.B.2.

195.   Greely, *supra* note 10, at 120. *But see* ELSTER, *supra* note 3, at 105–07 (criticizing this argument).

196.   DUXBURY, *supra* note 16, at 52; ELSTER, *supra* note 3, at 107.

197.   GOODWIN, *supra* note 65, at 45–46.

198.   *See also infra* Subpart II.B.2 (discussing this matter from an efficiency perspective).

199.   *See, e.g.*, *supra* note 164 and accompanying text.

200.   Greely, *supra* note 10, at 123–25.

201.   GOODWIN, *supra* note 65, at 45–46; *see also* STONE, *supra* note 66, at 86 (explaining the sanitizing effect of the lottery).

202.   *See* DUXBURY, *supra* note 16, at 13, 35 (explaining that no discretion means no blaming and no sense of guilt); GOODWIN, *supra* note 65, at 45–46 (same); Fienberg, *supra* note 8, at 256 (same).

allocator for the bad outcome even in the case of a random-based allocation, arguing that the lottery reduced their chance of obtaining the benefit or increased their chance of incurring the burden. But assuming that a lottery is held among equally eligible participants, this argument seems less acceptable and therefore less likely than a similar complaint in a non-random allocation.[203] Administrators of a random allocation may feel burdened by the process or the outcome, even if participants do not show discontent.[204] But such a burden will generally be very limited.

b. Disadvantages

The advantages of stripping the allocation from human agency may be accompanied by some drawbacks. First, there is a dignitary concern. In excluding human decision and leaving people's fate to chance, we reduce humans to ciphers, rather than sustaining them as persons with normatively significant attributes and interests, thereby undermining their dignity and diminishing their very humanity.[205] An observation about automated decisions is applicable *mutatis mutandis* to random selection: "[T]he interest in non-automated decision making is founded not simply on the possibility of machines making mistaken judgements; penultimately, the interest embodies a concern for personal integrity, and ultimately a concern for human dignity."[206] Accordingly, the European Data Protection Directive stipulates that a person would "not . . . be subject to a decision which produces legal effects concerning him . . . and which is based solely on automated processing of data intended to evaluate certain personal aspects relating to him."[207] The inherent tension between being human and being treated as a number is also manifested in the memorable introduction to every episode of the British television series *The Prisoner*, where the protagonist cries: "I am not a number, I am a free man."[208] Still, this argument loses some of its strength when one realizes that many factors

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203. Note, however, that from an efficiency perspective the psychological costs of burdening the allocator with the task of deciding on the merits may be much lower than the psychological costs of denying participants the resource on a random basis. *See infra* Subpart II.B.2.

204. Keren & Teigen, *supra* note 68, at 99.

205. Wolfle, *supra* note 37, at 1201 (arguing that lotteries deny humanity); *see also* DUXBURY, *supra* note 16, at 52, 90–91 (contending that it may be demeaning for a person that a decision on allocating risky burdens or scarce crucial resources is subject to luck); GOODWIN, *supra* note 65, at 46–47 (explaining that random allocation "undermines human dignity and diminishes the individual by attacking the very basis of individuality").

206. Lee A. Bygrave & Jens P. Berg, *Reflections on the Rationale for Data Protection Laws*, *in* 25 YEARS ANNIVERSARY ANTHOLOGY IN COMPUTERS AND LAW 3, 32 (Jon Bing & Olav Torvund eds., 1995).

207. Council Directive 95/46/EC, art. 15, 1995 O.J. (L 281) 31, 43 (EC).

208. Christine Alice Corcos, *"I Am Not a Number! I Am a Free Man!": Physical and Psychological Imprisonment in Science Fiction*, 25 LEGAL STUD. F. 471, 471 n.* (quoting *The Prisoner*) (internal quotation marks omitted) (2001).

people expect the legal system to respect (personal characteristics or relevant circumstances) are ultimately contingent on pure luck.[209] Moreover, in a digital economy, and even in the more traditional administrative state, people are treated as mere cogs and data points anyway.

Second, humans expect decisions to be reasoned, whereas random-based allocations are unreasoned.[210] In other words, random allocation circumvents rational thought and deliberation to which humans are committed.[211] As unreasoned decisions may be or may seem to be arbitrary or capricious, they contradict our basic intuition of fairness.[212] If reasons for an allocation are not given, one may suspect that the participants were treated unfairly. The lack of reasoning also has some relevance from an efficiency perspective, because public trust in lawmaking and law-applying powers hinges heavily on their ability to provide reasons.[213] However, this concern must be taken with a grain of salt. Random-based allocation methods are usually employed when it is impossible to rationalize allocating to some but not to the others (because all are equal in relevant aspects), or when there is no way to make a well-reasoned decision within a reasonable time frame. Put differently, reasoning is impossible or not reasonably practicable. In such cases, randomization may be the only reasonable way to make a decision, other than avoiding the allocation.[214] Of course, while a randomized decision is unreasoned, the decision to opt for chance must be reasoned. Sometimes there is simply no better alternative.[215]

Third, if the process is detached from human agency, participants are not given an opportunity to present their arguments and convince the

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209. DUXBURY, *supra* note 16, at 7–8; *cf.* THOMAS NAGEL, *Moral Luck*, *in* MORTAL QUESTIONS 24, 27 (1979) ("Our beliefs are always, ultimately, due to factors outside our control . . . .").

210. *See* DUXBURY, *supra* note 16, at 13 (explaining that lotteries are unreasoned); Brown, *supra* note 31, at 113.

211. GOODWIN, *supra* note 65, at 47. On the other hand, at least one author has contended that people have "an addiction to reason": they seek reason even when this is very costly and unnecessary. ELSTER, *supra* note 3, at 117 (emphasis omitted).

212. CALABRESI & BOBBITT, *supra* note 55, at 49 ("[W]e are born to reason and any attempt to keep someone from pointing out the unchosen choices that are being made is bound to fail."); DUXBURY, *supra* note 16, at 14 ("[W]e commonly want legal answers which . . . furnished with reasons as opposed to being based on instinct or caprice or some other emotional response."); Robert S. Summers, *Evaluating and Improving Legal Processes—A Plea for "Process Values,"* 60 CORNELL L. REV. 1, 26 (1974) ("[H]umans . . . prefer to order their affairs through reason rather than through random or arbitrary action . . . .").

213. Deborah Hellman, *The Importance of Appearing Principled*, 37 ARIZ. L. REV. 1107, 1109 (1995).

214. DUXBURY, *supra* note 16, at 118.

215. *See* Kornhauser & Sager, *supra* note 9, at 499 ("[A lottery] is the only way of making some allocation while respecting the equality of rights that characterizes the entitlement pool.").

allocator that they deserve the resource more than others.[216] Any argument they may have is muted, and they cannot affect the outcome. Participating in a process in which one cannot be heard and which one cannot affect irrespective of any available and convincing argument is disempowering.[217] Formally, denying the ability to present one's arguments may undermine the constitutional principle of due process.[218]

Fourth, without human agency no one can be held responsible or accountable for the outcome,[219] so participants have no one to blame or to appeal to (as long as the lottery was carried out properly). The inability to hold someone responsible and to contest his or her decision, even in one's own mind, is also a disempowering upshot of lotteries.[220] While this somewhat intuitive argument cannot in itself justify a rejection of random-based allocation, this concern should be kept in mind.

4. Second-Order Fairness

In some settings, employing a random-based allocation method ensures or facilitates fair treatment of people who do not take part in the primary allocation at all, that is, people who are neither the participants nor the allocator. This may be termed second-order, or external, fairness. The most obvious example is jury selection. In this case, the allocated burden is jury duty. In the United States federal system, this burden is initially allocated randomly among registered voters.[221] Random allocation is not only fair to prospective jurors in the egalitarian sense, but also generates a fairness-oriented advantage to people who do not take part in the allocation, namely litigants. Litigants expect to be judged by impartial fact finders.[222] Impartiality of fact finders is a necessary condition for procedural fairness. Random selection of jurors from among the general population generates a more representative decision-making body, reduces the likelihood of predisposition of juries, and secures fairer trials.[223]

Similarly, the judiciary randomly allocates cases among judges.[224] Various versions of random assignment of cases have also been common

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216. DUXBURY, *supra* note 16, at 133; Greely, *supra* note 10, at 122–23.

217. DUXBURY, *supra* note 16, at 51–52; *see also* Greely, *supra* note 10, at 122–23.

218. *See generally* U.S. CONST. amend. XIV.

219. DUXBURY, *supra* note 16, at 13; Brown, *supra* note 31, at 112–13.

220. DUXBURY, *supra* note 16, at 51–52; Greely, *supra* note 10, at 122–23.

221. DUXBURY, *supra* note 16, at 74–75. Even though the pool of jurors is further limited through nonrandom methods, the initial formation of the pool is random; this promotes fairness (and as explained below, efficiency).

222. ELSTER, *supra* note 3, at 95.

223. *See* Fienberg, *supra* note 8, at 255–56.

224. *See* Samaha, *supra* note 6, at 5, 47 (explaining that judges are typically assigned their cases through lotteries).

from ancient Athens to present-day Europe.[225] This burden of deciding cases of varying type, scope, and complexity among judges is allocated fairly in egalitarian terms. But randomization also generates fairness-oriented advantages to nonparticipants. In theory, judicial decisions should be independent of judges' identities. However, despite the facade of impartiality, legal realism assumes that judicial decisions are affected by judges' backgrounds and worldviews.[226] Empirical research has attempted to test this theoretical supposition, examining whether personal characteristics of judges play a role in judicial decision making. Many have found differences between the decisions of judges having different personal attributes, social and professional backgrounds, and revealed ideologies.[227] Through random assignment of cases, the system allocates judges' biases fairly among litigants.[228] All have the same chance of coming before any judge, with his or her respective biases. Here, the two components of fairness are symmetrical. So the situation can be viewed from the opposite perspective, as randomly allocating judicial resources to litigants, thereby generating a fairness-oriented advantage to judges.

A third example derives not from existing legal practice, but from a theoretical debate in the literature. Arguably, a plurality voting system generates a non-representative elected body: minorities are excluded and muted because their support is seldom translated into political power. Consider, for example, a system in which a single winner is elected by a plurality or a majority in each district (single-member district plurality). If 60% of the population in each district support Ideology *A*, and 40% support the competing Ideology *B*, members of the elected body will exclusively represent Ideology *A*. In a thirty-year-old note, Akhil Amar presented a provocative proposal: "Rather than automatically electing the candidate who receives a majority or plurality of votes," the winner will be chosen by "a lottery of the ballots cast."[229] A single ballot will be drawn randomly, and the candidate chosen on that ballot will win.[230] In the above example, the candidate supported by Group *A* would have a 60% chance of winning, whereas the candidate supported by Group *B* would have a 40% chance. According to Amar, "[t]he law of averages ensures that . . . an assembly

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225.   *See* ELSTER, *supra* note 3, at 93.

226.   Orley Ashenfelter et al., *Politics and the Judiciary: The Influence of Judicial Background on Case Outcomes*, 24 J. LEGAL STUD. 257, 257 (1995); *see also* JEROME FRANK, LAW AND THE MODERN MIND 111 (1930) ("The peculiar traits, disposition, biases and habits of the particular judge will . . . often determine what he decides to be the law.").

227.   *See* Tracey E. George, *Court Fixing*, 43 ARIZ. L. REV. 9 *passim* (2001) (discussing the impact of personal characteristics on judicial behavior).

228.   *Cf.* Kornhauser & Sager, *supra* note 9, at 488–89 (discussing the fairness of random selection among differently biased people).

229.   Amar, *supra* note 28, at 1283.

230.   *Id.*

selected by lottery voting would substantially reflect the underlying distribution of the votes in the polity.[231]

This method can be viewed from three angles. First, it allocates public offices among candidates based on a weighted lottery, giving each candidate a chance while maintaining a system of political-desert. Second, it allocates political impact among all citizens. This allocation is egalitarian in the sense that each citizen has an equal chance of her vote determining the outcome of the elections.[232] Third, the allocation of public offices through lotteries has a second-order fairness effect. Random selection of government officials promotes true representation of the population in public bodies.[233] While selecting a person randomly out of all citizens (as in ancient Athens) may bring to power incompetent people with no accountability, a weighted-lottery system, like that proposed by Amar, secures both representation and some level of merit-based screening. For those who consider representativeness a necessary component of a fair political system, this is an important consequence. A related argument, which goes beyond Amar's analysis, may be that the possible impact of each vote (the second angle) would increase participation in the elections. While in other contexts greater participation may lead to "rent dissipation," as explained below,[234] in the current context it may increase the sense of fairness by making the general public more content with the outcome (an addition to the third angle). However, this conjecture requires deeper analysis, because additional participation might ultimately harm minorities, who evince higher participation rates in the current system.

II. Efficiency

A. Overview

At first glance, random allocations may seem efficient due to the low administrative costs they entail.[235] If this preliminary intuition proves true, and absent fairness-based arguments to the contrary, one can advocate the use of lotteries as an allocation method. However, to establish the process's impact on aggregate welfare, various factors must be taken into account,

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231. *Id.* at 1293–96.

232. *Id.* at 1294. Amar also explains that "lottery voting increases and celebrates that sense of individual responsibility by guaranteeing that one individual's registered preference *will* 'count' in the strong sense." *Id.* at 1299–1300.

233. John Burnheim, Is Democracy Possible? 9 (1985) (arguing that to have democracy, elections should be replaced with "choosing by lot"); Ernest Callenbach & Michael Phillips, A Citizen Legislature 9–13 (1985).

234. *See infra* Subpart II.D.2.

235. *See infra* Subpart II.D (discussing administrative costs); *see also* Duxbury, *supra* note 16, at 53 (contending that lotteries may be efficient).

and some may undermine any intuitive belief that lotteries are efficient. An efficiency analysis of random allocations is complex. It calls for integrating a variety of theoretical arguments and distinguishing among the different allocative settings described in the Introduction. In this analysis, we compare lotteries to several alternatives: queues (FIFO), need-based allocations, merit-based allocations, and markets/auctions.[236]

The analysis will proceed as follows. First, we examine lotteries' direct impact on potential and actual recipients of the allocated resources, and their interaction (when relevant) with the allotted asset. Here we distinguish *ex ante* from *ex post* effects. We discuss recipients' ability, *ex post*, to maximize the utility of the allocated resource, as well as possible psychological effects. We then analyze *ex ante* changes in potential recipients' behavior brought about by random allocation mechanisms, also noting the outcomes of "insulation" from power structures facilitated by random processes. Next, we examine the administrative costs that random selection and its alternatives entail. Finally, we note the possible effects of random allocations on the welfare of the public at large, such as political economy dynamics, as well as lotteries' impact on knowledge and taxation policy.

B. Ex Post *Effects*

1. *Utilizing the Resource*

A major shortcoming of random allocations is that they fail to place resources in the hands of those who will obtain the greatest utility from them or will use them in a way that most enhances welfare.[237] Other allocation methods (auctions; merit-, need-, or skill-based allocations; and even queues) rely on welfare-enhancing criteria, such as need or skill, or on proxies for the participants' need, skill, or at least intensity of preferences. Random allocation, however, prides itself on treating all users alike, ignoring such criteria.[238] Thus, allocation on the basis of lotteries clearly generates a substantial loss of welfare—the utility to be derived from placing the resource in the hands of an optimal recipient.

The magnitude of this specific welfare loss depends on several factors. The first is the existence and efficiency of secondary markets which follow

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236.   *See also* DUXBURY, *supra* note 16, at 15–16 (comparing lotteries to allocations based on merit, money, and patience); ELSTER, *supra* note 3, at 67–69; Boyce, *supra* note 24, at 460; Samaha, *supra* note 6, at 14. We have also employed such a comparison when discussing fairness. *See supra* Subpart I.C.2.

237.   DUXBURY, *supra* note 16, at 58; Boyce, *supra* note 24, at 459 (formalizing this argument).

238.   In fact, this is what makes lotteries fair in the egalitarian sense, as explained above. *See supra* note 149 and accompanying text.

the initial allocation by lot, an issue that is somewhat beyond the reach of this Article.[239] When an efficient secondary market for the allocated resource exists, the welfare losses caused by "misallocation" might be reduced. Resources will eventually make their way into the hands of those who appreciate their value the most and can optimize their usage. In determining how random allocations affect aggregate welfare, one should account for the additional set of transaction costs the secondary market entails and the benefits of allowing such a market in terms of the ultimate allocation. These add to the costs and benefits of using a lottery for the initial allocation.

However, the damages of primary random allocations might not be repaired by a secondary market, given these markets' inability to reallocate resources efficiently after a problematic initial allocation.[240] In addition, the mitigating effect of secondary markets on the efficiency-based concern is irrelevant in many contexts discussed in this Article. Random allocations are often selected in instances where secondary markets are forbidden or impractical,[241] such as military drafts or allocating organs for transplants.[242] In these cases, lotteries are used to allocate resources which could be considered incommensurable with other resources, such as money. Where secondary markets are forbidden or impractical,[243] the problem of inefficient allocation persists.

Second, the measure of the welfare loss discussed in this Subpart depends on the heterogeneity of the relevant participant population in terms of skills to utilize, and the need for, the allocated resource. Heterogeneity is contingent on a variety of factors, including the nature of the resource and the expertise its various uses entail. The more potential recipients are alike (homogeneous) in these respects, the less is the loss caused by "misallocating" the good.

For the pool to be considered homogeneous, participants need not be strictly alike, but similar to the extent that the cost of delving deeper into the differences among them will be greater than the benefit of a more

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239. To demonstrate the complicated issues arising when considering the impact of secondary market on initial allocations (in the context of allocation via queues), see Perry & Zarsky, *supra* note 7, at 1654–58.

240. PAUL MILGROM, PUTTING AUCTION THEORY TO WORK 21 (2004).

241. *See* Boyce, *supra* note 24, at 457 ("In neo-classical welfare economics, the random distribution of property rights does not affect allocative efficiency as long as transferability is allowed and the transactions costs are non-prohibitive. Lottery allocations, however, are generally not transferable. Thus lottery allocations are inefficient since the goods are not ultimately allocated to the users who value them the most.").

242. DUXBURY, *supra* note 16, at 155 (noting the transferability of military duty during the Civil War and the backlash this policy generated); *see also* STONE, *supra* note 66, at 142.

243. This is usually done to preserve fairness. *See supra* note 184 and accompanying text.

precise allocation.[244] This is not merely a theoretical point. A homogeneous pool of lottery participants could be obtained by setting specific thresholds, premised on need, merit, or even payment, for those entering the lottery.[245] Indeed, various economists have strived to calculate the precise point where lotteries should be integrated with other allocation methods to achieve an efficient allocation among a heterogeneous-turned-homogeneous pool.[246] For example, random selection can be combined with a queue that generates waste by requiring waiting times but sorts heterogeneous participants.

Note, however, that in some instances a pool of heterogeneous participants—in terms of the capacity to generate welfare—can be considered homogeneous on moral grounds by the political and legal system; thus, some of the seemingly relevant differences among the participants might be deemed irrelevant.[247] Put differently, morality constrains efficiency. This may be the case when allocating organs for transplant[248] or seats on a raft lost at sea.[249]

2. Psychological Effects

We now turn to a somewhat speculative discussion on the psychological impact of lotteries on participants. Random allocations might generate both additional grief and encouragement. If the random process systematically generates greater aggravation or discomfort than its alternatives, this factor too must be entered into the aggregate welfare calculation.[250] In contrast, if random or other allocations are considered

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244.   *See* ELSTER, *supra* note 3, at 107–08 ("The costs of fine-tuned screening of candidates who pass a threshold of minimal qualification may be prohibitively high, compared with the social gains from choosing the best.").

245.   ELSTER, *supra* note 3, at 67–68; STONE, *supra* note 66, at 137.

246.   Surajeet Chakravarty & Todd R. Kaplan, *Optimal Allocation Without Transfer Payments*, 77 GAMES & ECON. BEHAV. 1 *passim* (2013); *see also* Winston T.H. Koh et al., *Lottery Rather than Waiting-Line Auction*, 27 SOC. CHOICE & WELFARE 289, 293 (2006) ("[T]he lottery is more (less) efficient than the waiting-line auction if resource misallocation in the lottery is smaller (larger) than the rent-seeking costs incurred in a waiting-line auction.").

247.   *See supra* Subpart I.C.2.a.

248.   James F. Childress, *Who Shall Live When Not All Can Live?*, 4 SOUNDINGS 339, 348–49 (1970).

249.   *Cf*. United States v. Holmes, 26 F. Cas. 360, 367 (E.D. Pa. 1842) (No. 15,383) (rejecting the defendant's argument for absolute equality between all people on the ship and explaining that "sailors and passengers . . . cannot be regarded as in equal positions").

250.   *See* Torstein Eckhoff, *Lotteries in Allocative Situations*, 28 SOC. SCI. INFO. 5, 8 (1989) (noting the importance of "recipient reactions").

fair,[251] or generate other positive psychological effects, straying from them will upset participants and decrease welfare.[252]

This Subpart calls for returning to our distinction between "winners" and "losers"—those selected and not selected to reap the allocated benefits. While the analysis thus far has focused on lottery winners, one must consider the impact of employing this allocation method on those who draw the proverbial, and sometimes actual, short straw, as opposed to those who lose through other allocation methods. Of course, a lottery winner may in fact be a "tragic-winner," when the lottery allocates burdens, as in the case of a military draft. Those not selected are then "lucky-losers." Additionally, one must note that lotteries may yield many losers and only a few winners. This may happen in the case of sortition, where only very few holders of public offices are randomly selected from the entire population, or in the case of allocating a scarce resource among many participants. In other instances, a lottery generates few tragic-winners and many lucky-losers. Consider, for example, the random selection of the one passenger who must be tossed off a raft, or the Roman process of "decimation."[253]

The psychological effects of random allocations can both increase and decrease welfare. Some argue that denial of a benefit by lot is a less stressful outcome than denial by other allocation methods.[254] Here, the unlucky ones incur neither social stigma nor lower self-esteem as losers.[255] For that reason, the use of lotteries generates additional utility as compared to the alternatives. To this argument one can retort that lottery winners, as opposed to those winning on the merits, will not receive a substantial boost from their victory, so the welfare that the allocation process can generate diminishes.[256] Hence the lottery's psychological benefits are mitigated and may even be exceeded by the losses. This tradeoff is affected, *inter alia*, by the number of winners compared to the number of losers, although the psychological effects on the two types are not necessarily of the same magnitude.

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251. *See supra* Subpart I.B.

252. *See* Kaplow & Shavell, *supra* note 67, at 1035 ("[I]ndividuals may have tastes for a notion of fairness, and, to that extent, a welfare economic analysis of legal rules takes their tastes into account."); *cf.* Perry & Zarsky, *supra* note 7, at 1638–39 (discussing this concern with respect to queues).

253. *See* STONE, *supra* note 66, at 9–10 (explaining that "decimation" is a process in which a military unit was punished for mutiny or desertion by selecting and executing one soldier out of ten).

254. *See* ELSTER, *supra* note 3, at 107 ("To be rejected by fortune was less dishonourable than to be rejected by the community."); Childress, *supra* note 248, at 351.

255. *See* DUXBURY, *supra* note 16, at 52 (discussing the work of Berger); STONE, *supra* note 66, at 124–26, 137 (discussing the works of CARSON & MARTIN, *supra* note 78, and Greely, *supra* note 10); *see also supra* notes 195–196 and accompanying text.

256. In some instances, that may not be a bad thing, as in the case of politicians who might demonstrate humility. DUXBURY, *supra* note 16, at 35.

The psychological impact of winning and losing by lot could be viewed from a different perspective. Those denied a benefit, and possibly even those who win, might sense that the lottery process is degrading[257] and leads to the loss of self-esteem[258] as people are treated as mere ciphers.[259] A lottery also denies losers a reason for their loss, or at least the recognition that such reasons indeed exist.[260] Consequently, individuals may object to lotteries, finding them odd and offensive.[261] This negative sentiment, to the extent that it truly exists, will be avoided if alternative strategies are applied. Yet the tide might be turning, as the accumulating literature sympathetic to lotteries implies.[262]

A final point in this context pertains equally to winners and losers. Random allocation might generate aggravation, which in turn reduces aggregate welfare, for those whose religious convictions prevent them from participating in lotteries. Such people may characterize the use of lotteries as immoral,[263] as invoking divinity in vain,[264] or even as blasphemous if lottery results are considered random and not guided by the hand of providence.[265] It seems however that this position has been declining, and very few will be offended in such a way today.[266]

To summarize, the possible psychological effects must be approached through an experimental/empirical and case-specific study.[267] Certainly, these effects might change from one context to another, and vary on the cultural and generational levels.[268]

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257. *See* Duxbury, *supra* note 16, at 52, 87 (contending that the process is demeaning).

258. *See* Elster, *supra* note 3, at 105 (rejecting this point and arguing that self-esteem is merely a byproduct).

259. *See* Duxbury, *supra* note 16, at 136 (explaining the argument that lottery losers are unable to blame an official, express anger, and reach a catharsis, and questioning the logic of this argument); Stone, *supra* note 66, at 104 (referring to Wolfle); *supra* notes 205–209 and accompanying text.

260. *See* Duxbury, *supra* note 16, at 114–16 (discussing somewhat critically the human need for "reason" which is undermined by random selections); *supra* notes 210–215 and accompanying text.

261. *See* Duxbury, *supra* note 16, at 74 (discussing people's emotional objection to lotteries); Elster, *supra* note 3, at 118 (same); Stone, *supra* note 66, at 94 (same); John E. Coons, *Consistency*, 75 Cal. L. Rev. 59, 110 (1987) ("People resist having their noses rubbed in the randomness of the system.").

262. *See* Stone, *supra* note 66, at 14 (identifying a trend of sympathetic writing about lotteries in the last thirty years which might indicate a change in the public attitude).

263. *Cf. Black Cab Lottery Draw Will 'Discriminate against Muslims'*, Manchester Evening News (Mar. 1, 2010, 15:07), http://www.manchestereveningnews.co.uk/news/local-news/black-cab-lottery-draw-will-discriminate-884213 ("Proposals to make black cab drivers enter into a lottery for their licences would discriminate against religions that strictly forbid gambling.").

264. Duxbury, *supra* note 16, at 19.

265. *Id.*

266. Elster, *supra* note 3, at 28.

267. Perhaps one must further distinguish between situations in which people enter the lottery willfully, and other instances. *See* Stone, *supra* note 66, at 57–58 (discussing the importance of consent in this context).

268. The analysis of psychological effects could prove even more complex when accounting for the post-allocation change in preferences and attitudes towards the allocated resources, and the possible

C. Ex Ante *Effects*

1. *Random = "No Effect"*

Employing a random-based allocation method may affect potential recipients before and during the allocation process, regardless of the outcome. The selected method may induce pursuers to take or refrain from taking certain actions. These impacts, in turn, affect aggregate welfare. On the face of it, these *ex ante* effects should be trivial. Individuals cannot affect or predict the outcome of a random process so they will presumably refrain from changing their conduct to increase their odds of winning. Therefore, one should compare the positive and negative *ex ante* effects of other allocation methods to a baseline of "no effect" in random-allocations. However, a closer look (in Subpart II.C.2) will reveal interesting behavioral effects that random allocations nonetheless generate. At the outset, a non-trivial assumption is required. Our analysis assumes that individuals may strategically change their behavior in response to a declared allocation method (be it random or other). This assumption is fair when the parties are sophisticated and the allocated resource is of value.[269]

We begin with a plausible proposition that rational actors subjected to decision by lot take no actions in response. To that we compare *ex ante* effects triggered by other allocation methods. When allocations are premised on merit, skill, or even queues, potential recipients are incentivized to take steps to improve their prospects of receiving the resource. They will strive to obtain the attributes accounted for in the allocation process, namely skills, education, or even a temporal advantage. This segment of the analysis is of greater relevance where entering the allocation process is voluntary.

On the one hand, steps taken *ex ante* by participants enhance welfare—an enhancement lost when opting for random allocation.[270] This is especially evident in allocations premised on skill or merit, gauged through factors like education or extracurricular activities, such as volunteering and charity. Participants' attempts to meet various criteria generate positive spillovers, as they learn trades and acquire knowledge, which they can apply for the common good, even if in the end they do not obtain the

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impact of the allocation method on this change. *Cf.* JON ELSTER, EXPLAINING SOCIAL BEHAVIOR 39 (2007) ("We do not know which conditions will trigger conformism or anticonformism . . . adaptive preferences (sour grapes) or counteradaptive preferences (the grass is greener).").

269. *See* ROBERT C. ELLICKSON, ORDER WITHOUT LAW 144–45 (1991) (discussing the impact of legal incentives on conduct); Robert D. Cooter & Edward L. Rubin, *A Theory of Loss Allocation for Consumer Payments*, 66 TEX. L. REV. 63, 89–90 (1987) (same).

270. *See* DUXBURY, *supra* note 16, at 58 (explaining that random allocations reduce the incentive for competition); Samaha, *supra* note 6, at 24 (explaining how random allocations undermine constructive planning).

allocated resource. However, some of these incentives could still be provided by setting pre-selection criteria for entering the lottery participants' pool, and may thus be evident in a random process as well.

On the other hand, *ex ante* actions taken by participants in non-random allocations may generate waste, which a random allocation helps avoid. In some cases, the skills needed for utilizing a resource are specific. Consider, for example, training to operate a unique machine or specific computer system or language which only one firm uses. No positive spillover will result from training those who are not ultimately selected. For them, any *ex ante* investment is lost. In other cases, the allocation process entails costs which are borne by all participants and generate no utility at all.[271] Such is the case with some instances of queuing, which generate losses deriving from the idleness of those waiting.[272] This phenomenon is often referred to as "rent dissipation."[273] In the most extreme cases, participants might engage *ex ante* in harmful and wasteful activities to meet or escape allocation criteria. This might occur in the context of conscription. If the factor used here is a measure of fitness, individuals might be inclined to engage in self-mutilation to avoid the draft.[274] A lottery would prevent this. Another form of social waste is eliminated in lotteries by removing discretion from the hands of decision makers. In the absence of discretion, potential recipients refrain from socially undesirable lobbying[275] and bribery.[276]

2.   *Random Allocations Driving* Ex Ante *Conduct*

a.   *General Effects*

At times, the prospect of selection by a random process generates some forms of *ex ante* behavior. This changes the above-mentioned baseline for comparing lotteries to other allocation methods. The *ex ante* effects of random allocation are most evident when participation in the allocation is *mandatory* and all are subject to it, as in the case of random tax rates and

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271.   Another example of wasteful activities is purchasing houses in proximity to coveted schools, when slots at such schools are allocated on the basis of student proximity. These dynamics needlessly inflate real estate prices in that area. STONE, *supra* note 66, at 142.

272.   Yoram Barzel, *A Theory of Rationing by Waiting*, 17 J.L. & ECON. 73, 80 (1974); Chakravarty & Kaplan, *supra* note 246, at 2.

273.   *See* David D. Haddock, *First Possession Versus Optimal Timing: Limiting the Dissipation of Economic Value*, 64 WASH. U. L.Q. 775, 776–77, 783 (1986).

274.   ELSTER, *supra* note 3, at 110.

275.   *See* DENNIS C. MUELLER, PUBLIC CHOICE 117–19 (1979) (discussing the inefficiencies of lobbying).

276.   *See* Samaha, *supra* note 6, at 21, 45 (contending that randomization eliminates all incentives and thus battles corruption and abuse).

audits. In these cases, many individuals in all population segments adapt their activities as if they are to be selected *ex post*, given the probability that this might occur. In some of these contexts, a lottery operates not only as a method of selection, but also as one of deterrence. Again, lotteries must be compared to other allocation methods, where substantive criteria are used for selection. The uniqueness of random allocation lies in its *ex ante* impact on *all* participants. In other allocation methods, some individuals can establish that they most likely do not meet such selection criteria (and this might be a broad segment of society). The *ex ante* conduct of those who understand that they will not be selected is not affected.

Before proceeding to analyze this point, it is important to note that individuals' responses *ex ante* in the face of a lottery are not identical but are affected by their risk aversion or risk seeking.[277] Risk-neutral or risk-seeking individuals might ignore the chance of selection and refrain from adjusting their behavior in response to the lottery. Risk-averse individuals, on the other hand, might fear being selected, even when their chance of selection is slim, and adjust their conduct accordingly. For example, in the case of random selection for higher tax rates, one may work harder, and in the case of random tax audits one may truthfully report income.

The simplest example of an *ex ante* response to lotteries lies in the context of law enforcement. On the one hand, the government strives to assure law and order, locate criminals and bring them to justice, as well as deter criminal activity. On the other hand, it does not want to bear the costs of comprehensive law enforcement. Therefore, government agents engage in random stops, searches, and tax audits.[278] In addition, scholars have toyed with the idea of random sentencing of convicts,[279] or the random selection of tort claims for trial.[280] In these cases the sanction that best fits the wrong, punishment or tort damages, must be multiplied by the reciprocal of the probability of imposing a sanction on a wrongdoer to ensure efficient deterrence.[281] For instance, a double fine is imposed when only half of the wrongdoers are sanctioned.

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277. DUXBURY, *supra* note 16, at 128.

278. This practice must also withstand constitutional scrutiny. *See* Samaha, *supra* note 6, at 43 ("If officials lack probable cause with respect to everyone in the pool, then randomized searches are vulnerable to judicial rebuff in the absence of special circumstances."); Christopher Slobogin, *Government Dragnets*, 73 LAW & CONTEMP. PROBS., Summer 2010, at 107 (addressing problems with suspiciousless searches); *supra* Subpart I.C.2.b, and *infra* note 282.

279. David Lewis, *The Punishment that Leaves Something to Chance*, 18 PHIL. & PUB. AFF. 53 (1989) (suggesting that courts impose double the current sanction on some criminals and let others walk free, so that the expected punishment would remain the same).

280. Rosenberg & Shavell, *supra* note 59, at 1724–25.

281. *See* Ronen Perry, *Re-torts*, 59 ALA. L. REV. 987, 1009–12 (2008) (discussing the reciprocal method).

A different example of the use of lotteries to provide some deterrence where punishing all criminals was impractical is the historical practice of "decimation";[282] Roman generals wanted to discipline deserting and rebellious soldiers and deter such conduct in other units. Yet they could not afford to lose soldiers. The compromise: select one soldier out of ten and put him to death, while pardoning the others. Similar practices were reported in Scandinavian countries.[283] These actions presumably affected individuals contemplating these crimes. The ancient practice was recently revisited (with a twist) in popular culture in *The Hunger Games* trilogy.[284] Here the public was not necessarily punished or deterred *ex ante* in the simple sense. Yet the specter of selection by lottery for participation in the games and an almost guaranteed death sent a powerful message of the risks and results of revolts, and of the subordination of all "sectors" to the main government ("Capitol").[285] Lotteries can also be used to deter governmental abuse where "punishing" all governmental violations seems impractical, as in the proposal for randomly suppressing evidence if collected in violation of constitutional rights, that is, randomly applying an exclusionary rule.[286]

Identifying the *ex ante* effects of random allocations is insufficient. An assessment of this method's efficiency calls for a comparison to the alternatives. The most basic argument in this context is that with sufficient tweaking and the enhancement of sanctions, random allocation of law enforcement and punishing can produce similar *ex ante* effects to those of selecting and punishing *all* relevant wrongdoers, but at lower costs. Thus, the random-based scheme is more efficient overall. Indeed, setting decimation aside given its unique traits and practical irrelevance, random selection may be structured to produce a similar outcome to subjecting all wrongdoers to sanctions. Consider fining 100 illegally parked cars $1, or ten selected cars $10. Similarly, consider incarcerating 100 criminals for one year each, as opposed to incarcerating ten criminals randomly selected from a 100 for ten years each. In these cases, the government's intake in terms of penalties, or the costs of administrating months of incarceration, will be the same. Assuming risk neutrality, the cost–benefit analysis run by potential wrongdoers is the same as well, because these models multiply

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282.   *See supra* note 253 and accompanying text.

283.   Eckhoff, *supra* note 250, at 17.

284.   SUZANNE COLLINS, THE HUNGER GAMES 18 (2008).

285.   *Id.* ("In punishment for the uprising, each of the twelve districts must provide . . . [two] tributes[] to participate. [They] will be imprisoned in a vast outdoor arena . . . . [and] must fight to the death. The last tribute standing wins. Taking the kids from our districts, forcing them to kill one another while we watch—this is the Capitol's way of reminding us how totally we are at their mercy.").

286.   James D. Miller, *Using Lotteries to Expand the Range of Litigation Settlements*, 26 J. LEGAL STUD. 69, 92 (1997). This proposal is rejected and somewhat ridiculed in Eugene Milhizer, *The Exclusionary Rule Lottery*, 39 U. TOL. L. REV. 755 *passim* (2008).

the base sanction by the reciprocal of the chance of being selected.[287] The real difference a random process makes lies in saving administrative costs, not needing to examine and audit all individuals.

Is random selection as efficient as other selection methods in terms of deterring crime through selective enforcement? Random enforcement is often compared to the popular use of profiles to set aside suspects, which might be considered analogous to allocation on the basis of merit.[288] Comparing the two systems (lotteries versus profiling) in terms of deterrence and crime avoidance calls for a case-specific examination and will clearly vary according to the precision of the profiling process. A closer look at the comparison between lotteries and other methods that also accounts for additional factors might suggest that lotteries applied in broad mandatory allocations produce even better results than the alternatives, given the nature of the *ex ante* response these alternatives generate. As noted above, non-random allocation methods sometimes lead potential recipients to take *ex ante* actions that reduce welfare.

Phrased somewhat differently, such an argument was powerfully set forth by Bernard Harcourt, who advocated the use of lotteries in law enforcement.[289] Harcourt stressed that other allocation methods, which single out a specific and relatively small population segment as suspects, encourage the others—a very large segment of the population—to engage in criminal conduct, as their risk of being caught is apparently far lower.[290] Hence the outcome of using law enforcement strategies which profile and target specific populations will be more crime, not less.[291] The fact that non-random selection methods end up enhancing rather than deterring unwanted behavior leads Harcourt to strongly recommend random selection processes in the contexts discussed.[292] Harcourt's argument is not without problems and is only valid when specific conditions are met.[293] For

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287. Of course, this method may raise fairness concerns because it gives rise to significant disproportion between the severity of the sanction and the gravity of the wrong. In the criminal law context, it might also prove unconstitutional. *See* Youngjae Lee, *The Constitutional Right Against Excessive Punishment*, 91 VA. L. REV. 677, 683–87 (2005) (contending that the "Eighth Amendment ban on excessive punishments should be understood as a side constraint" that embodies the principles of ordinal and cardinal proportionality). These issues are beyond the scope of this Article.

288. The use of profiling for selection raises an abundance of fairness and constitutional issues (even assuming that the factors used in profiling are not race-related). *See generally* United States v. Sokolow, 490 U.S. 1 (1989) (discussing the use of profiling); FREDERICK SCHAUER, PROFILES, PROBABILITIES AND STEREOTYPES 177 (2003) (observing that the use of profiling is widespread).

289. BERNARD E. HARCOURT, AGAINST PREDICTION: PROFILING, POLICING, AND PUNISHING IN AN ACTUARIAL AGE 2–3 (2007).

290. *Id.* at 3.

291. *Id.* at 23.

292. *Id.* at 5.

293. *See* Tal Z. Zarsky, *Transparent Predictions*, 2013 U. ILL. L. REV. 1503, 1558 (discussing the various problems Harcourt's argument raises, with particular emphasis on its underlying assumptions with respect to the transparency of the profiling system).

instance, individuals included in a group which is predicted to pose lower risks of criminal conduct will not be easily motivated to take illegal action just because of a very low chance of detection and punishment. Therefore, the argument is more convincing with respect to tax evasion (a more elastic form of behavior) than with respect to planning terrorist attacks, although both types of crime have occasionally been deterred by randomly implemented measures.

b.   Selective Effects

In addition to deterring all individuals from specific actions by putting all people at risk of being sanctioned, lotteries may have a screening effect, namely moving only *some* individuals to take *ex ante* welfare-enhancing actions. This provocative notion was set forth by Joseph Stiglitz when advocating the adoption of random tax rates.[294] According to this view, the random allocation system, although pertaining to all, is set in place to motivate different participants to behave differently. Let us demonstrate this abstract notion in the concrete context of governmental attempts to influence the leisure/labor division.[295] Each individual decides how much time and energy to devote to work as opposed to leisure. Sometimes, individuals who can increase their higher activity levels, and generate greater social welfare, refrain from doing so for various reasons. Responding to this challenge of inefficiency, the government can introduce higher tax rates, which impact individuals' decision to further contribute to the workforce when they indeed can. Ideally, the government should target those with excess labor capacity with higher tax rates so as to incentivize them to work harder.[296]

However, the government has scant information about individuals' relevant abilities and preferences, and about the optimal leisure/labor balance. Therefore, introducing measures that account for "need" or "merit" into the tax system is extremely costly and even impractical. Stiglitz recommends the introduction of random tax rates.[297] The prospect of a higher rate motivates risk-averse (and perhaps even risk-neutral[298])

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294.   Joseph E. Stiglitz, *Utilitarianism and Horizontal Equity: The Case for Random Taxation*, 18 J. PUB. ECON. 1 *passim* (1982) (considering random tax rates on income and consumption).

295.   *See also* Laurence Weiss, *The Desirability of Cheating Incentives and Randomnness in the Optimal Income Tax*, 84 J. POL. ECON. 1343, 1347 (1976) (advocating random income tax rates instead of certain rates which yield the same revenue).

296.   The text clearly refers to changes in the basic tax rate. Changes in an individual's marginal tax rate will most likely have the opposite effect, and provide an incentive to reduce labor.

297.   Stiglitz, *supra* note 294, at 28.

298.   *See* F.R. Chang & D.E. Wildasin, *Randomization of Commodity Taxes: An Expenditure Minimization Approach*, 31 J. PUB. ECON. 329, 330, 342 (1986) (extending Stiglitz's model and advocating random tax rates irrespective of taxpayers' risk aversion).

individuals who *can* potentially increase their income to actually do so. These individuals are motivated by the fear of being selected after-the-fact for a higher tax rate and being left with less capital. The choice to enhance labor by the selected group will lead to a more efficient workforce. Moreover, it will lead to additional tax revenue and allow for lowering the overall tax rate as the government reaches its required quota. Lower tax rates, especially on consumption, may further contribute to aggregate welfare to the extent that higher tax rates dampen overall consumption.[299] The point here is not that random allocations of tax rates are the only or even the ideal way to address an inefficient labor/leisure balance, but more generally that lotteries may have a selective *ex ante* effect which enhances aggregate welfare.

3. *The Shadow of the Lottery*[300]

The analysis thus far has examined the welfare implications of random-based allocations. Yet the fact that the allocator indicated that a lottery could or should be used does not necessarily imply it was used at the end of the day. At times, the welfare-generating traits of a random-based design do not derive from the process itself, but from its "shadow," namely the threat its potential use poses *ex ante* to potential recipients. In other words, in some cases a decision to allocate by lot is welfare enhancing or decreasing not because of the lottery that follows but because of the parties' attempt to *avoid* the lottery.[301] This segment of the analysis pertains to lotteries entered into voluntarily, at least by one of the parties.

Threatening to allocate a resource in a particular way to induce parties to share private information regarding their expected utility is an ancient practice.[302] It was famously applied by King Solomon.[303] A threat to divide a newborn infant between disputing mothers[304] might not be reliable today, but threatening that disputes will be settled by lottery might incentivize disputants to provide private information and to reach an amicable solution

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299. Leandra Lederman & Ted Sichelman, *Enforcement as Substance in Tax Compliance*, 70 WASH. & LEE L. REV. 1679, 1710–14 (2013).

300. *See also* DUXBURY, *supra* note 16, at 162 (using this terminology).

301. Other dynamics also transpire in the shadow of the lot. As explained above, individuals may strive to enter or avoid the lottery, or to change their chances of being selected. ELSTER, *supra* note 3, at 78. But in these cases, as opposed to those discussed here, lotteries ultimately take place, and do not constitute a mere threat that does not generally materialize.

302. Ian Ayres & Eric Talley, *Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade*, 104 YALE L.J. 1027, 1031 (1995) ("[W]e compare bargaining in the shadow of an absolute, undivided entitlement to bargaining in the shadow of a number of such Solomonic divisions."); Miller, *supra* note 286, at 69.

303. This explains the titles of Elster's book (*supra* note 3), Ayres & Talley's paper (*supra* note 302), and many other works in this area.

304. 1 *Kings* 3:16–28.

before the courts delve into their quarrels. We will now briefly address these threats, and their impact on welfare, focusing on civil litigation and settlement. The literature has discussed the idea of inducing private information sharing by a threatened use of a lottery where the number of litigants, who are the allocation participants, is relatively small, and coordination costs are reasonable.[305]

We begin our discussion with a somewhat modest proposal. Rosenberg and Shavell proposed a system whereby only half of all tort cases will be litigated and decided by courts, and the cases to be litigated will be selected by lottery.[306] Put differently, 50% of the cases will be immediately dismissed, and only the other half will proceed to litigation. Upon finding a defendant liable, courts will double the damages. This proposal's main purpose is to promote efficiency by limiting the costs of litigation. Fifty percent of the cases will be dismissed and the respective administrative costs saved, while the expected liability of potential defendants will remain sufficiently high to deter tortuous conduct. Yet beyond this benefit, already noted above, Rosenberg and Shavell argue that in such a novel system both parties—risk-averse plaintiffs[307] at risk of having their claims automatically dismissed, and defendants at risk of paying double damages—will have greater incentives to settle prior to filing the claim. The parties will be motivated to share private information and settle in view of the risks that proceeding with the claim entails.[308] Rosenberg and Shavell further speculate that the inclination to settle after the filing of the claim and its random selection to proceed to trial will be similar to that existing under the current system.[309] The nature of the settlement will also enhance welfare as it will be achieved earlier in the process, again saving transaction costs.[310] The shadow of the lottery enhances efficiency by inducing parties to settle, to do so earlier, and to reach a more efficient outcome by sharing more private information.[311]

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305.   *See infra* notes 312–316 and accompanying text. *But cf.* Shay Lavie, *Reverse Sampling: Holding Lotteries to Allocate the Proceeds of Small-Claims Class Actions*, 79 GEO. WASH. L. REV. 1065, 1073–75 (2011) (discussing the cost saved when applying a random method to allocate funds in class actions, rather than seeking out all relevant plaintiffs).

306.   Rosenberg & Shavell, *supra* note 59, *passim*.

307.   The authors assume both parties are risk-averse—an assumption which is indeed debatable. *Id.* at 1726.

308.   *Id.* at 1728.

309.   *Id.*

310.   The nature of the settlement itself is assumed to be an efficient distribution of the resource given the parties' consent and the private information they have about their use of the resource. We will question this assertion below.

311.   *See also* Miller, *supra* note 286, at 70 (addressing this situation but reaching different conclusions).

In theory, lotteries can be applied not only in the pre-trial stage but also in deciding hard cases.[312] Elster, for instance, famously argued that on reaching an impasse, a judge may declare that visitation rights will be established by lot if the parties do not decide otherwise.[313] While this matter raises various concerns, it could also be viewed as a measure to incentivize parties to compromise and settle, "or else" the lottery will be applied. Beyond the difficult issues of fairness and the indirect impact on the prestige of the judiciary,[314] one must ask whether this outcome would indeed prove efficient. In theory this might be plausible. Parties will respond to the uncertainty the lottery generates by providing each other with additional private information, thereby reaching a settlement which is more efficient than a court ruling (based on less accurate information), while consuming less administrative resources.

Ayres and Talley examine a very similar situation in their study of "Solomonic Bargaining."[315] They explain that providing both parties with rights in the underlying resource generates powerful incentives to disclose truthful information while negotiating a settlement to resolve a property dispute. These dynamics in turn lead to efficient distributions, as they are premised on greater and more accurate information. However, a similar outcome could be achieved when both parties have equal probabilities of receiving the resource. In other words, if both parties enter a dispute with uncertainty as to who will be allotted ownership—and thus who will end up the purchaser and who the seller—they will provide accurate information to each other as part of the negotiation towards a settlement. Such an outcome could result from very blurry legal rules, or a decision-making process which involves flipping a coin.[316] In short, negotiations carried out and settlements reached in the shadow of this form of a lottery might prove welfare enhancing.

There are several caveats to the argument regarding the efficiency of settling in the shadow of the judicial lottery. First, the analysis above conjectures that the threat of random decisions will lead to efficient outcomes. Yet this prediction rests on the non-trivial assumption that all parties involved share the same attitude to risk. When one party is risk-neutral and the other risk-averse the outcome of the settlement negotiations might not be efficient, and additional surplus may find its way to the risk-

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312. *See generally* Samaha, *supra* note 6, at 67–70 (discussing the possible use of "merits randomization" in hard cases and stating that "[i]t is extremely unlikely that the theoretically correct number of lotteries in merits adjudication is zero").

313. ELSTER, *supra* note 3, at 171.

314. *See* DUXBURY, *supra* note 16, at 164 (referring to the work of Fuller).

315. Ayres & Talley, *supra* note 302.

316. *Id.* at 1073–78.

neutral party.[317] Similarly, the analysis assumes that the parties share the same level of negotiation skills and understanding of the situation faced. But when one party is a seasoned negotiator and possibly a repeat player, the allocation of resources again might not prove efficient.[318]

Furthermore, to establish whether welfare is enhanced in the shadow of the lottery, one must look beyond the settlements reached, and take stock of the welfare lost when parties do not settle and their case is decided randomly. Clearly, and as explained in Subpart II.B.1 above, such allocation is inefficient, as the rights allocated by the lottery-using court will not be transferred in accordance with a legal rule set in place to promote efficiency, but at random. Deciding whether the threat of a lottery will prove welfare enhancing therefore calls for establishing the ratio of cases ultimately settled, as well as the accuracy with which professional judges are able to efficiently allocate rights in litigation under an alternative regime. If cases may settle very frequently in the shadow of a lottery, and courts are likely to get their outcome wrong on the merits, welfare may indeed be enhanced by the threat of a lottery. But in other cases, the shadow of the lottery might not be welfare enhancing.

Finally, carrying out this balance and establishing the merit of the shadow of the lottery must not neglect the possible impact of lottery rules on the adjudication process in general and the decision maker in particular. To begin with, a shift to decision by lot will affect the number of disputes, just as allocation of other resources by lot impacts the number of participants.[319] Moreover, if case outcomes, namely the extent of damages, and not only the decision to litigate (as in the Rosenberg and Shavell scheme[320]) are determined by lot, those with weaker claims will now move to bring action. This will happen because these plaintiffs' non-existent chance of prevailing in court or reaching a lucrative settlement changes in view of the lottery.[321] If this dynamic unfolds, the efficiency of the entire process will be compromised, and resources will be erroneously assigned. Thus, random ruling cannot be automated, but must come only after an initial finding that the relevant case is difficult.[322]

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317. Indeed, studies show that plaintiffs and defendants do not demonstrate risk-neutral behavior in legal processes, although both might be either risk-averse or risk-seeking in different settings. *See* Randall L. Kiser et al., *Let's Not Make a Deal: An Empirical Study of Decision Making in Unsuccessful Settlement Negotiations*, 5 J. EMPIRICAL LEGAL STUD. 551, 554–55, 567 (2008).

318. *Cf.* Oren Gazal-Ayal & Ronen Perry, *Imbalances of Power in ADR: The Impact of Representation and Dispute Resolution Method on Case Outcomes*, 39 LAW & SOC. INQUIRY 791 (2014) (discussing the impact of power imbalances on the outcomes of ADR processes).

319. *See infra* Subpart II.D.2.

320. *See generally* Rosenberg & Shavell, *supra* note 59.

321. DUXBURY, *supra* note 16, at 165.

322. *Id.* at 161.

Leaving the door open for random decisions in legal disputes also generates a complicated set of incentives for the decision maker. If the decision maker allows a greater number of cases, even those that clearly lack merit, to move to the random-decision course, this might reduce the utility derived from the incentives this process provides for sharing private information. Unfortunately, this outcome might be inescapable. When judges and other decision makers are provided with an easy way out of a dispute (namely using a lottery), they might opt for it even when it is unnecessary, as opposed to engaging in a rigorous factual and legal analysis yielding a reasoned decision. For allocators facing a thick pile of disputes which require settling, the temptation to label the case "difficult" and thus apply a simple random solution would be great.[323] This might compromise the integrity, hence the efficiency, of the random-based scheme.[324]

4. Insulation from Power Structures

In some instances, randomization contributes to aggregate welfare by insulating the allocation process from external forces.[325] The following discussion is based on the assumption that allocation of political and administrative "power" and "office," as well as governmental contracts and resources through cronyism and favoritism for the rich and powerful, decreases welfare.[326] Ultimately, such practices stunt growth and allow powerful social segments to extract rents,[327] dissipating them at least partly in an attempt to manipulate decision-making processes.

Random allocations enhance efficiency by insulating the allocator, thus limiting opportunities for abusing the allocation.[328] Other forms of allocation could be "gamed" and manipulated by powerful social forces, swaying and structuring the allocation process to their benefit, at times through small and seemingly innocuous changes in allocation criteria. For

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323. *But see id.* at 165 (speculating that judges opting for a lottery will be reprimanded by their peers and thereby discouraged from such conduct). For a discussion of a similar concern, namely that judges might opt for a "split-the-difference" solution if permitted, rather than rigorously adjudicate the case, see Gideon Parchomovsky et al., *Of Equal Wrongs and Half Rights*, 82 N.Y.U. L. REV. 738, 775–76 (2007).

324. For an analysis of the overall impact of the analogous "split-the-difference" solution on efficiency, see Parchomovsky et al., *supra* note 323, at 776–78.

325. STONE, *supra* note 66, at 47–49; *see also* ELSTER, *supra* note 3, at 95; GOODWIN, *supra* note 65, at 45.

326. MUELLER, *supra* note 275, at 97–124 (discussing these effects).

327. Some might challenge this assumption given recent extraordinary growth in "crony capitalist" countries. *See* CRONY CAPITALISM AND ECONOMIC GROWTH IN LATIN AMERICA: THEORY AND EVIDENCE *passim* (Stephen Haber ed., 2002).

328. *See* Samaha, *supra* note 6, at 16, 21 (noting that randomization "tie[s] the hands of decision makers").

example, they can set educational, experience, financial, or social requirements which only members of a specific subgroup possess.[329] Lotteries are by nature easier to supervise,[330] and are therefore unlikely to involve covert manipulation by external forces. Of course, a lottery might vest power and influence in the hands of a biased and prejudiced individual. But in the long run, especially where the selection process is periodically repeated, one may hope such negative effects are relaxed.[331]

These benefits of random allocations must also be balanced against the recipients' possible lack of expertise, knowledge, or even strong preference to receive the resource. For instance, in the context of sortition or even jury selection,[332] the noted benefits of insulation from influence must be balanced against the possible lack of skill in those selected. They will certainly be deficient in knowledge and preparation.[333] If the average lottery participant is less competent than the average member of the favored class (who may be capable and successful), lotteries are difficult to justify with efficiency-based claims.

To a lesser extent, random processes may also insulate candidates from bribes or blackmail by powerful interest holders prior to selection. Consider, in contrast, candidates for office in a process which involves selection by merit or through popular vote. Such candidacy is well known and candidates could be approached. With random selection, those interested in influencing and bribing are unable to focus on potential candidates because the pool is too large. While this analysis neglects post-selection attempts to influence or bribe, these exist irrespective of the allocation method and are, arguably, easier to thwart. Post-selection, those chosen could be isolated, insulated, or aggressively monitored.[334] Similarly, prospective jurors, who are quickly isolated after their appointment, are saved from uncomfortable and at times intimidating situations of attempted pre-selection influence. Overall, randomization helps ensure that the selected are rendered impartial in view of such influence, and hence carry out their duties or utilize the allocated resource to the best of their ability. Similar arguments were set forth to explain practices of sortition, namely selecting representatives for office, in ancient Greece, Venice, and

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329.   STONE, *supra* note 66, at 140.

330.   Eckhoff, *supra* note 250, at 11.

331.   *See* Richard H. Thaler, *Illusions and Mirages in Public Policy*, 73 PUB. INT. 60 (1983) (suggesting that congressmen be assigned to committees by lottery); *see also* Samaha, *supra* note 6, at 47 (discussing whether this logic also applies to the assignment of cases to judges).

332.   *See* DUXBURY, *supra* note 16, at 43, 75 (discussing jury selection); ELSTER, *supra* note 3, at 95 (same); Eckhoff, *supra* note 250, at 15 (same).

333.   DUXBURY, *supra* note 16, at 23.

334.   Such enhanced scrutiny is difficult to scale and thus hard to achieve at the pre-selection period.

Florence.[335] Some scholars have proposed random selection of politicians and bureaucrats for similar reasons.[336]

D. Administrative Costs

1. Allocator's Operation Costs

Casting lots is far from a costless venture. Lotteries require a "stable physical device that generates one of several possible outcomes with known probabilities."[337] Historically, coins, dice, and lottery wheels have been used for this purpose.[338] Prior to the drawing of the lots, random selection often requires matching numbers to tasks or individuals. It further necessitates effort in administrating the process smoothly and transparently, as well as assuring the broader public that the process is indeed random. Therefore, as opposed to queues, which merely call for a calendar or a wristwatch,[339] the basic requirements and infrastructure needs for random-based allocations seem more substantial. Today, however, computers can quite easily generate and present random numbers and facilitate matching.[340] So while the costs of performing these tasks are not negligible, they seem substantially lower than those of the alternative methods.[341] Lotteries do not require examining and comparing the specific characteristics of all applicants. In addition, and as opposed to physical queues, they do not call for any form of crowd control, monitoring, or enforcement throughout the allocation process.

Still, lotteries are by definition centralized processes. They require not only central planning, but also public trust that the system is not tainted, rigged, or predictable for some of the participants. Executing a reliable lottery may not be an easy task, as the draft lotteries demonstrated.[342] Given the high stakes involved, the draft lotteries' reliability was questioned and contested in courts.[343] Where initial trust would be hard to achieve (i.e., it is

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335.   DUXBURY, *supra* note 16, at 32 (explaining that this process reduced incentives for bribing officials); STONE, *supra* note 66, at 120–24.

336.   *See supra* notes 229–232 and accompanying text; *see also* CALLENBACH & PHILLIPS, *supra* note 233, at 75 (discussing the idea of electing congressmen by lottery).

337.   JON ELSTER, ULYSSES UNBOUND: STUDIES IN RATIONALITY, PRECOMMITMENT, AND CONSTRAINTS 242 (2000).

338.   *Id.*

339.   Perry & Zarsky, *supra* note 7, at 36.

340.   DUXBURY, *supra* note 16, at 104.

341.   *See id.* at 54 (noting that lotteries are "highly economical means of decision-making"); Samaha, *supra* note 6, at 16 (explaining that randomization cuts decision costs); *see also* Lavie, *supra* note 305, at 1073–75 (discussing the cost saved when applying a random method to allocate funds in class actions).

342.   *See infra* notes 401–407 and accompanying text.

343.   *See id.*

difficult to convince the public the lottery is fair), a lottery might be inferior in terms of administrative costs to other methods such as auctions or queues, which are mostly transparent by nature. Indeed, queues entail simple rules and are at times self-generated and even self-monitored and enforced,[344] whereas lotteries are not.

In view of the above, the greatest administrative advantage of allocation by lot seems to be that its costs scale well. Once a system is in place, and thanks to modern technology, the difference between selecting a random number out of a hundred, a thousand, or millions is negligible. Other aspects of the process do not scale so well. There are still costs for administrating the marginal lottery participant. Nevertheless, at least intuitively these marginal costs are substantially lower than administrating the marginal auction participant, not to mention the marginal applicant when a decision is premised on merit or need.[345]

Random allocation tasks, apart from constructing a random-selection apparatus, also call for more limited administrative skills than other allocation methods. Administering a random selection scheme is simple and technical, and can be carried out by unskilled employees. This contrasts with the skills needed to administer merit- and need-based allocations, as well as the operation of auctions.[346] Thus, after accounting for the form of labor, the low costs of random allocations are apparent.

Beyond the costs of merely administrating the process, other costs also tend to be lower in lotteries. Quite often, particularly in merit- or need-based allocations, the losing party will contest the outcome. Indeed the frequent contests faced by the Federal Communications Commission (FCC) in its merit-based allocation of radio frequency spectrum led to its shift to a short-lived random spectrum allocation scheme.[347] Even queues and auctions can easily be challenged. But once a trustworthy lottery scheme is conducted, it is quite difficult to challenge the outcome, given the very limited role of human discretion and the transparency of the technical process. True, when the stakes are high even random allocations face legal challenges, and indeed the military draft lotteries were challenged several times in court. Still, these challenges are easily defeated

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344. Perry & Zarsky, *supra* note 7, at 1630–31.

345. Comparing the scalability of queues and lotteries, as well as the costs of administering the marginal potential recipient, is a difficult and context-specific question which calls for in-depth study, beyond the scope of this Article.

346. STUART MINOR BENJAMIN ET AL., TELECOMMUNICATIONS LAW AND POLICY 174–75 (2d ed. 2006) (discussing the spectrum allocation through lotteries and auctions); Evan Kwerel & Alex D. Felker, *Using Auctions to Select FCC Licensees* 14 (FCC Office of Plans & Policy, Working Paper No. 16, 1985), *available at* http://transition.fcc.gov/Bureaus/OPP/working_papers/oppwp16.pdf (comparing FCC professional and administrative costs).

347. *See* Kwerel & Felker, *supra* note 346, at 3 (discussing the high costs and vast delay which followed spectrum allocation through a hearing process).

if the process has been administered fairly, as the challenges to the draft were.[348] Courts tended to uphold lotteries as long as they were epistemically (as opposed to objectively, or statistically) random.[349]

To summarize, a lottery allows for a low-cost allocation, especially when trust can easily be maintained, unskilled labor is cheap, and the pool of applicants is large. An example of a setting where lotteries worked well was the distribution of oil leases for areas of limited prospects and value by the Bureau of Land Management (BLM).[350] Here, the government contemplated alternatives but in the end turned them down given the low expected value of the land distributed. The government considered selling the land or auctioning it off, but found these options too expensive as they called for high costs of appraising and administrating the lease.[351] The administrative costs would have surpassed the income that the process would yield. The government then turned to lotteries, which allowed for a quick allocation of land, beneficial to all parties.

Finally, we turn to a different perspective, that of the allocators. For them, random allocations allow for the reduction of the psychological costs of making difficult decisions.[352] Historically, many of the reported cases of decision by lot involved life and death, as in military drafts and allocation of scarce medical treatment. Making such decisions on the merits is a taxing and daunting experience, which decision makers will be happy to avoid. Randomization allows them to do so, at greater speed, and with less anxiety about possible errors.[353] By limiting the psychological costs, welfare is somewhat enhanced. However, this benefit is of limited importance. While the personal gains may be real, they only pertain to the decision maker, and will probably make a limited impact on aggregate welfare.

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348. *See* United States v. Kotrlik, 465 F.2d 976, 977 (9th Cir. 1972) (adopting an epistemic definition of randomness, requiring that "there was no plan, purpose or pattern in the drawing of the numbers"); ELSTER, *supra* note 3, at 44 (explaining that even if the dice "were loaded" or there was insufficient mixing of the relevant balls or notes, the allocation would still be rendered fair to the extent that no one was aware of this problem); Samaha, *supra* note 6, at 44.

349. *See supra* notes 8–12 and accompanying text.

350. Haspel, *supra* note 25, at 29–30. *But cf.* Abraham E. Haspel, *Drilling for Dollars: The New and Improved Federal Oil Lease Program*, 13 REG. 62, 63, 67 (1990) (explaining that the lottery system was subject to some abuse and political disfavor, and was later replaced; at times, the subsequent allocation methods proved more efficient).

351. Haspel, *supra* note 25, at 29.

352. *See supra* notes 199–204 and accompanying text.

353. *See* STONE, *supra* note 66, at 36 (calling this a "sanitizing effect"); Eckhoff, *supra* note 250, at 19 (explaining that lotteries remove responsibilities from the deciders). However, according to Keren & Teigen, *supra* note 68, at 99, even random allocations may generate some anxiety for the allocator.

2. *Participants' Pool Size*

The analysis thus far has neglected a crucial element, as it holds the number of participants in the allocation process constant. However, when comparing the administrative costs of lotteries and other allocation methods a possible change in the number of participants throughout the process must be accounted for.[354] Generally, potential recipients will engage in self-selection and refrain from entering the pool of candidates when their prospects for selection are extremely low. This will occur on their realization that they will most likely fail to meet the relevant criteria in the case of selection on the basis of merit or need, or lack the necessary resources (monetary in the case of an auction, or time in the case of a queue) required to receive the resource. Random allocations will not generate similar self-selection. Therefore, and as long as the costs of participation are low, a vastly greater number of people will strive to participate, continuously joining so long as the prospect of a future profit exists. This may result in rent dissipation: "in an unbiased lottery with open entry, marginal entrants are discouraged only when all rents have been dissipated."[355] Moreover, the prospect of selection may motivate intermediaries (or "application mills") to prod individuals to sign up for a fee that these "mills" collect and participate in the lottery. Such intermediaries will lure participants by noting that they stand the same chance of winning as anyone else, thereby inflating the pool.[356]

Therefore, one must examine whether the various benefits of random allocations offset the costs of the significantly greater number of participants. This is not always the case. The FCC learned this fact the hard way. In the early 1980s, the FCC chose to allocate spectrum bandwidth on a lottery basis, departing from the merit-based process ("hearings") used up to that point.[357] In response, applications literally piled up.[358] News reports even indicated that a structural engineer had been brought in to ascertain that the FCC building could withstand the weight of the paperwork delivered.[359] The volume of applications clearly exceeded that of applications submitted when the FCC engaged in allocations based on

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354.   BENJAMIN ET AL., *supra* note 346, at 175–76.

355.   Hazlett & Michaels, *supra* note 63, at 427. However, the authors conceded after examining the entire market dynamic that not all rents were dissipated. This was explained by several market failures.

356.   BENJAMIN ET AL., *supra* note 346, at 176. For a sharp critique of these "license mills" in the context of spectrum allocations, see William Kummel, *Spectrum Bids, Bets, and Budgets: Seeking an Optimal Allocation and Assignment Process for Domestic Commercial Electromagnetic Spectrum Products, Services, and Technology*, 48 FED. COMM. L.J. 511, 526–27 (1996).

357.   Boyce, *supra* note 24, at 470; Kwerel & Felker, *supra* note 346, at 4.

358.   Kwerel & Felker, *supra* note 346, at 4–6.

359.   BENJAMIN ET AL., *supra* note 346, at 176.

auctions or "beauty contests" which are a variation of a merit-based allocation.[360]

However, in some instances greater interest by the public is a blessing. This might have been the case with regard to the BLM oil lease allocations mentioned above. Here the random allocation method indeed attracted greater participation, but this led to more exploration and, in turn, greater production and governmental royalties.[361] In other words, rents did not dissipate due to the relatively little interest, attributed to various market barriers such as limited information or high cost of utilizing the allocated resource. Yet in the radio frequency spectrum allocation setting, the enhanced interest was excessive, and dissipated the other gains produced by the random process, rendering it inefficient. If lotteries generate excessive levels of participation, administrative costs can potentially be reduced by the setting of prerequisites, a step the FCC actually took by introducing registration and merit-based eligibility criteria.[362] These steps naturally have their own costs and associated risks.

3. Decision Speed

Not only is allocation by lottery cheaper, it is generally faster than its alternatives. The process need not involve contemplation by the decision maker prior to the decision, and as explained above will be mostly insulated from challenges after the decision.[363] Therefore, the time elapsed between the beginning and the end of the allocation process is limited. The speed of the decision-making process enhances welfare in several ways, principally by limiting the idleness of the elements involved. The parties—potential and actual recipients, as well as decision makers—will be free to engage in other activities. The resource itself will be quickly utilized and generate welfare, albeit not necessarily in the hands of the most competent recipient, as noted above. For instance, radio frequency spectrum allocated by the FCC could be quickly used for cell phone communications; similarly, a life-saving organ could be speedily transferred to a needy patient. With that respect, lotteries are more efficient than allocations premised on merit or need. They are probably superior to most market dynamics, because even quick auctions are still slower than a random process. Indeed, lotteries are often recommended in instances where there is no time for a "rational" decision.[364]

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360. *See* Kwerel & Felker, *supra* note 346, at 12 (emphasizing that in auctions the bidder must ultimately pay the offered price).

361. *See* DUXBURY, *supra* note 16, at 152–53; *supra* note 350 and accompanying text.

362. Kummel, *supra* note 356, at 527.

363. *See supra* note 348 and accompanying text.

364. DUXBURY, *supra* note 16, at 71.

A comparison to queues remains. As we explain elsewhere, in several instances queues, rather than lotteries, can provide quicker responses.[365] To begin with, queues save time if a very high frequency of decisions is necessary, as at traffic junctions. Queues allow quick resolution of allocation decisions by using temporal advantage—a factor which in some cases is clearly apparent and does not require *any* centrally administered selection, which evidently takes time. Queues also provide a simple response to instances that feature a continuous flow of potential recipients and allocated resources, such as ongoing trades in financial markets or filling parking spaces. Here, lotteries call first for establishing a pool of potential participants and only then for administrating the random selection. This process involves some idleness for all parties involved, and with it unnecessary delay costs. Queues, however, allow for the allocation of rights on an ongoing basis and without the delay associated with the lottery process.[366] In sum, lotteries seem efficient in administrating large allocations, but are inferior to queues in some instances in terms of idleness and the resulting costs. In these instances, queues are often applied in practice.

E.   *The Political Economy of Random Allocations*

Our analysis thus far shows that the decision as to whether resources or burdens should be allocated by lot or by alternative methods has important and interesting implications for aggregate welfare. Yet another layer of considerations emerges in connection with the effects of the political economy. Hereby we address two such effects, each relevant to a different form of lottery. The first pertains to mandatory lotteries which are usually applied to the entire population. The second addresses a voluntary lottery which allows individuals in a pre-selected group to receive a specific resource at a substantial discount. Somewhat surprisingly, the two effects yield contradictory conclusions: the former shows the welfare-enhancing aspects of the lottery, the latter its shortcomings.

1.   *The Extent of the Allocated Resource*

When much-needed resources are allocated, lotteries can ensure that the entire population is seriously engaged in the political discussions and

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365.   Perry & Zarsky, *supra* note 7, at 1630–34.

366.   While FIFO-based allocations may be efficient in such cases, they might be deemed unfair. *See* Frank Pasquale, The Emperor's New Codes: Reputation and Search Algorithms in the Finance Sector   62–64   (Apr.   16,   2013)   (unpublished   manuscript),   *available   at* http://governingalgorithms.org/wp-content/uploads/2013/05/2-paper-pasquale.pdf   (discussing   the unfairness arising from the use of queues for setting priority in high frequency trading).

decisions regarding the need for and scope of the allocated resource.[367] Such engagement and interest resulting from random allocations might enhance efficiency. This interesting perspective is related to the cross-over of individuals from the world of potential resource recipients, to the world of citizens and decision makers in a democratic state.

To demonstrate, consider the random allocation of military draft numbers, where the resource is freedom from military service and the associated risks. Here, the specter of random selection leads the entire population, including its leaders and members of powerful sectors, who are all subjected to the tyranny of the same selection mechanism, to weigh in and seriously contemplate the need and utility of military action, hence of the military draft.[368] Similar arguments have been made with regard to the allocation of other scarce resources which directly impact human life, such as organs or costly medical treatment. In these contexts, the specter of random selection will motivate everyone, including members of the politically strong segments, to contemplate "increasing the pie," making the relevant resource more widely available, and increasing their own chances of obtaining it in times of need.[369]

Let us now link these ideas to this Part's underlying goal. Clearly, an interesting dynamic of *ex ante* reactions might be at work, but is it destined to have any systematic impact on aggregate welfare? Seemingly, this insight provides additional support for the argument that random allocations may enhance aggregate welfare. As explained above, other allocation methods (merit, auctions, and even queues) allow stronger groups to game the system and assure they receive the goods and avoid the burdens. Moving to the political arena, the prospect of distributive bias may make stronger groups indifferent to the scope of the allocated resources.[370] They are thus inclined to structure these resources in ways which overburden weaker social groups. The outcome might be systematically detrimental to specific groups subjected to the relevant allocation process. In random allocations, on the other hand, members of all social segments have an equal chance of obtaining the resource or bearing the burden. Nor are the decision makers themselves shielded from the implications of their actions. So no one is indifferent, and all have an interest in setting the extent of the resource at a level which best serves all people, not only the politically powerful.

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367. DUXBURY, *supra* note 16, at 165; GOODWIN, *supra* note 65, at 127–29; STONE, *supra* note 66, at 66–70; Hofstee, *supra* note 53, at 748; Samaha, *supra* note 6, at 21–23.

368. ELSTER, *supra* note 3, at 68.

369. *Cf.* Perry & Zarsky, *supra* note 7, at 1637–41 (discussing the interplay between the allocation method and the scope of the allocated resource in the context of FIFO).

370. E.g., the prospect of military service or the extent of available emergency medical attention.

Although similar, the argument here is different from the previous discussion about the benefit of random allocations in limiting cronyism[371] and the rent dissipation associated with needless lobbying.[372] The current argument pertains to an additional dimension. It does not address the efficiency of the allocation process itself, but the efficiency of external, broader decisions which pertain to the extent and scope of the relevant resource. These decisions too are affected, and may even prove welfare enhancing, when a random allocation mechanism is used.

However, this argument should be somewhat downplayed. The political economy dynamics generated by random allocations might be just as inefficient as those caused by alternative allocations. In view of mounting political pressures to "produce" more of a certain resource, such as medical devices, or reduce a certain burden, such as war, public officials might misunderstand or miscalculate the real risks and benefits involved in changing the scope of the resource or the burden.[373] They may then make decisions just as bad as those made under the political pressures built up by non-random allocation processes. The proper yet somewhat impractical response to this thorny problem would be to vest decision-making powers with respect to the extent of crucial resources in a panel of professionals. Such a panel would be free from the influence of politics generally, and from pressures to make prompt and possibly inefficient decisions.

2. Pre-Selection, Rent Seeking, and Dissipation

When lotteries constitute merely one step in a broader allocation mechanism that includes pre-lottery or post-lottery stages, they run the risk of enabling self-interested, inefficient behavior.[374] The key to this point is the fact that lotteries allow allocators, especially the government, to distribute the relevant resources at a discount, that is, below the price the allocator would have received had it chosen to auction them off.[375] This may attract attempts by people who meet the eligibility requirements, but have no use for the allocated resource, to participate in the lottery, hoping to win and gain profit from transferring the resource to another (rent-

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371.   *See supra* notes 325–327 and accompanying text.

372.   *See supra* note 275 and accompanying text.

373.   *See generally* Cass R. Sunstein, Worst Case Scenarios 4–5 (2007) (discussing errors made when considering responses to the risk of worst-case scenarios).

374.   *See* Boyce, *supra* note 24, *passim* (applying public choice theory to an examination of random allocation mechanisms).

375.   This outcome might follow merit- and need-based allocations as well. It must not occur in FIFO-based allocations, because the subsidy provided in allocating the resource is balanced by the cost of the time invested in receiving it. Barzel, *supra* note 272, at 94–95.

seeking behavior). A limited group of interested parties stands to profit from receiving the resources through the lottery.

Transferability prohibitions are often adopted, and may deter speculative rent seeking. However, the "non-transferable lottery,"[376] a lottery allocating non-transferable assets, is "inefficient in a rent-dissipation sense."[377] Because the process enables participants to extract rents, namely receive goods below market value, prospective recipients will no doubt lobby to insulate their group with a strict pre- or post-selection process to protect their interests, and block others from joining the lottery. For example, local hunters can advocate prohibiting residents of a different state from participating in a lottery for hunting permits. The individuals' lobbying efforts and related expenses can be referred to as dissipated rents, amount to waste, and reduce aggregate welfare.[378] This insight is important, especially in view of our previous discussion of features that decrease lobbying-related expenses.[379] We emphasize that the focus here is on lobbying with respect to delineating the boundaries of the participants' pool, not with respect to other aspects of the allocation discussed above. The setting of a pre-selection prerequisite to a much coveted lottery, according to this argument, leads to the inevitable destruction of value.

F.   Broad Social Effects

1.   Aggregation of Private Information

Random allocations, particularly when participation is voluntary, may have an impact on information flow and the creation of knowledge. These somewhat hidden factors should also be taken into account when a random allocation scheme is considered. As explained above, a random-based allocation sets aside any requirements for signaling from potential recipients. Their preference intensity is of no relevance or importance in this process. Thus, the allocator, which is often the government, and the public at large (where transaction specifications are made public) lose important insights that information regarding preference intensity can convey.[380] For instance, in the radio frequency spectrum allocation context, random allocations, as opposed to the auctions that replaced them, deprived both markets and governments of a proper understanding as to how this spectrum could be utilized—a realm of knowledge in which the

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376.   Boyce, *supra* note 24, at 469 n.15.

377.   *Id.* at 469.

378.   *Id.*

379.   *See supra* Part II.C.4.

380.   *See* Chakravarty & Kaplan, *supra* note 246, at 2 (explaining how random allocation methods ignore private information).

commercial recipients enjoyed a clear advantage. In other instances, the information lost in the switch to random allocations could indicate market demand, and thus instruct decision makers to expand the relevant resource. In sum, alternative allocation methods may generate positive externalities by enriching the public domain with important information that random allocations do not generate.

2. Social Experimentation

Allocation by lot provides a social benefit, which again derives from the availability of valuable information. Random allocation allows the initiation of social experiments, which can provide important insights into the causes and effects of various social policies.[381] The extent of knowledge derived from randomization and the steps that should be taken to enhance it were recently studied by Michael Abramowicz, Ian Ayres, and Yair Listokin.[382] They explained that randomization is the best way to structure control and treatment groups which are sufficiently similar,[383] and deduced that the use of random selection should be broadened.[384] In many cases, the two groups of lottery winners and losers are statistically similar at the time of the allocation. Thus, any significant differences observed after the allocation between the two groups can be attributed to the fact that members of one group received the resource or incurred the burden, whereas members of the other group did not. This benefit does not unfold when other allocation methods are applied, where the groups of winners and losers are clearly distinct, according to the allocation criterion (merit, need, willingness to pay, or a temporal advantage). As opposed to almost all arguments in this Part, the idea of social experimentation pertains to lotteries that are objectively, not only epistemically, random.[385]

This pro-lottery argument has its limits. In some instances, inferences cannot be drawn from the random sample receiving the allocation to the broader public. This occurs when the sample is too small,[386] when it is driven by self-selection, and when the randomization is not perfect given attrition, crossover among the groups, and spillovers (when laws and market conditions applied to those selected randomly impact those who

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381.   *See* Abramowicz et al., *supra* note 59, at 976 (noting that this method may help reveal a causal effect); Samaha, *supra* note 6, at 40–41 (contending that the benefits of experimentation must be considered when establishing the propriety of randomization).

382.   Abramowicz et al., *supra* note 59; *see also* Samaha, *supra* note 6, at 23 (making a similar argument).

383.   Abramowicz et al., *supra* note 59, at 935–36.

384.   *Id.* at 933.

385.   Recall that objective randomization can only be approximated. *See supra* note 12 and accompanying text.

386.   Abramowicz et al., *supra* note 59, at 951.

were not selected as well).[387] This justification for random allocation has time limits too[388]: random allocation can only be justified as long as the experimental data are sought. After the necessary knowledge has been obtained, randomization loses this justification.[389]

3. Efficient Taxation

In this Part, we focus on instances in which the government applies lotteries to allocate limited resources, such as radio frequency spectrum, land, drilling rights, or other concessions, to the selected few, especially when participation is voluntary. In most such instances, particularly if a strict pre-selection process is applied to limit rent dissipation, the resource is provided to the lucky recipient at a hefty discount, as explained above.[390] This discount is the difference between the recipient's willingness to pay (WTP) at an auction or an open market and the fees collected for participating in the lottery. To that extent, winning the lottery is a windfall for the recipient.[391]

This windfall raises difficult distributional questions. However, enabling such a windfall raises efficiency considerations as well, especially as against the market- or auction-based alternative. In an auction, the additional value is placed in the hands of the state, as recipients transfer substantial sums to the government's coffers. Obviously, this allocation method is very popular with government officials.[392] Transforming the lucky lottery-winner's windfall into additional state income is also arguably more efficient.[393]

To understand why, we must first assume that the government needs minimal funding to operate. The government usually raises these funds through taxation. But this has a nasty habit of distorting economic behavior and often decreases efficiency as it inhibits welfare-enhancing conduct.[394] Therefore, finding a method to apply a non-distorting tax, or some other

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387. *Id.* at 957–60.

388. We focus here on the utilitarian justification. Randomly subjecting people to different treatment for the sake of experimentation may obviously raise moral concerns.

389. Abramowicz et al., *supra* note 59, at 973.

390. *See supra* Part II.E.2.

391. *See generally* Eric Kades, *Windfalls*, 108 YALE L.J. 1489, 1491 (1999) ("[Windfalls are] economic gains independent of work, planning, or other productive activities that society wishes to reward.") (emphasis omitted). The nature and extent of this "windfall" are also affected by the transferability of the allocated resource. *See supra* Part II.E.2.

392. *See* Yochai Benkler, *Open Wireless vs. Licensed Spectrum: Evidence from Market Adoption*, 26 HARV. J.L. & TECH. 69, 159–60 (2012) ("[A]uctions are politically attractive precisely because they are available for use in the general treasury.").

393. *See* Thomas W. Hazlett et al., *What Really Matters in Spectrum Allocation Design*, 10 NW. J. TECH. & INTELL. PROP. 93, 106 (2012) (discussing relevant sources on this point).

394. Kades, *supra* note 391, at 1494.

measure to collect funds, will enhance welfare. With such measures in place, other tax burdens can be eased, and the inefficiencies they generate avoided. Taxation of windfalls is considered non-distorting. Since the recipients had no expectation of receiving it, their incentives are not affected. From this general argument one can quickly move to explaining that applying auctions, which allow the government to capture the full surplus recipients are willing to pay,[395] is efficient as well, since it replaces "revenues raised via activity-distorting taxes."[396] Put differently, lotteries do not enable the lowering of these distorting taxes and somewhat inadvertently decrease welfare.

Yet this argument against lotteries may be contested. For instance, conducting auctions sometimes constitutes an indirect tax as well.[397] The costs incurred by an auction winner (or the surplus passed on to the government) may be rolled over to consumers and others commercially interacting with that winner, especially when it controls a specific market. Consider, for example, cell phone users, who may be funding the amounts paid to the government for using the airwaves.[398] When these indirect payments generate distortions, auctions rather than lotteries lead to greater inefficiencies by encumbering markets with such costs. The distortion generated by high auction prices is further exacerbated by the financial barriers that auctions erect around specific markets and their protection of incumbents. For example, in the context of spectrum for cell phone use, the dominant players, Verizon and AT&T, have been the only firms able to pay the high auction price for a newly allocated spectrum.[399] For these reasons, the literature arguing for the efficient outcomes of taxing windfalls cannot easily be applied to all contexts involving lottery recipients. The relevance of this argument must be limited to instances in which the tax is not easily rolled onward and markets are not distorted.

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395.   At times, auctions even lead recipients to overcommit to payment beyond their means. We leave this difficult issue for another day.

396.   Hazlett et al., *supra* note 393, at 106.

397.   Benkler, *supra* note 392, at 160 ("As a practical matter, then, auctions function as a tax but are not politically perceived as such.").

398.   Experts have not reached a consensus as to the effects of license fees on consumer prices. *See* Youngsun Kwon et al., *Economic and Policy Implications of Spectrum License Fee Payment Methods*, 34 TELECOMM. POL'Y 175, 175 (2010). According to microeconomic theory, "[a] fixed cost does not affect consumer prices." *Id.* at 176. Consumer prices are merely affected by marginal costs. However, other studies have indicated that higher consumer prices might follow high auction prices, at least in the long run. *Id.* at 176–77.

399.   *Id.* at 160 (explaining how, in the radio frequency spectrum allocation context, non-restricted auctions allowed the two dominant firms which value the spectrum the most, to keep dominating the market). *But see* Thomas W. Hazlett, *Spectrum Flash Dance: Eli Noam's Proposal for "Open Access" to Radio Waves*, 41 J.L. & ECON. 805, 809 (1998) (criticizing the argument that auctions limit entry). *See also* Kwon et al., *supra* note 398, at 181 (discussing the possible link between auction fees and an oligopoly market structure, which sometimes results from steps taken by the government to reduce supply and increase revenue).

CONCLUSION

This Article has provided an innovative theoretical framework—integrating fairness and efficiency—for assessing the role of randomization in resource allocation. In doing so, it has presented a wide array of actual and potential legal applications. The Article began by examining, on two interconnected levels, whether lotteries are fair. On the positive level, there is some empirical evidence for the perceived fairness of lotteries as tie-breakers.[400] On the normative level, the Article analyzed four possible arguments, or sets of arguments, pertaining to lotteries' fairness or lack thereof. First, it explained the obsolete theological argument that random selection reflects divine intervention, and is therefore a justified method. Second, it critically evaluated the egalitarian argument that when participants are roughly equal they should be treated equally, and lotteries treat them that way. Third, the Article discussed the fairness-related advantages and disadvantages of processual detachment from human agency. Finally, it focused on fairness to people who do not partake in the primary allocation.

The efficiency analysis produced interesting yet mixed results. On the one hand, random allocations generate inefficiencies by allocating resources to those who cannot utilize them best or do not need them the most. Additionally, using lotteries may prevent efficient preparation for a forthcoming allocation process. On the other hand, given that one can neither prepare for nor manipulate the outcome of a lottery, random allocation also limits wasteful activities which plague other allocation methods, including cronyism and corruption. Moreover, lotteries may have a warranted effect on people's conduct: they can incentivize participants to settle a case, to abide by the law, or even to work harder. Furthermore, random allocations may reduce administrative costs, although this benefit may be partially offset, in some cases, by an increase in the number of participants. We have also shown that lotteries generate notable, somewhat conflicting psychological costs and benefits, which must be included in any aggregate welfare calculation. Finally, lotteries may have broader social implications. Adverse effects may include an impediment to information flow and—in the case of public allocation—a market-distorting taxation system. A positive effect may be the accumulation of valuable knowledge through social experimentation.

In recent years, legal scholarship has shown increasing interest in the actual or possible application of random selection methods in concrete contexts. The theoretical framework set out in this Article provides legal

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400. Admittedly, however, the findings with respect to lotteries' fairness are weaker and more qualified than those pertaining to queues.

scholars and policymakers with a powerful analytical tool. A roadmap which builds on the massive corpus of multidisciplinary scholarship on the subject ensures that relevant considerations are generally accounted for. Without it, scholars and policy makers can easily miss out on arguments which may strengthen or weaken their point. To demonstrate, consider the weighted voting lottery proposed by Akhil Amar. In a thoughtful note, Amar discussed various advantages and shortcomings of his proposal. Still, he neglected the impact of the proposed model on voting turnout. The theoretical framework provided here makes clear that voter turnout would be affected, just as lotteries incentivize participation in other realms.

The Article has made two methodological concessions. The first concerns the reliability of random selection. In addition to the general impossibility of "objective randomness" (explained in the Introduction), lotteries have raised many concrete reliability concerns.[401] For instance, in the 1940 and 1969 military draft lotteries, there were serious reliability issues: participants argued that the process had not been carried out properly, and courts had to tackle these allegations.[402] Moreover, it is impossible to determine whether a process was (approximately) random based solely on the outcome.[403] Lastly, people tend to misperceive the existence or nonexistence of randomness.[404] These concerns could undermine the practical value of the entire project. However, technological progress in the second half of twentieth century made randomization more feasible and reliable.[405] Our theoretical analysis assumes that all technical and psychological problems can be satisfactorily resolved, leaving the remaining doubts to others.

The second methodological concession concerns circumvention tactics, namely the use of wealth or power to increase the chances of obtaining the allocated resource or avoiding the allocated burden, or to obtain the resource without participating in the lottery. For example, the Enrollment and Conscription Act of 1863 allowed randomly selected draftees to dodge military service by paying $300, but this scheme caused widespread outrage, and was not repeated in subsequent drafts.[406] During the Vietnam War, drafts were also randomized, but college students were exempted from military service, giving rise to allegations of class and race

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401.   *See* ELSTER, *supra* note 3, at 45 (discussing imperfections in U.S. military draft lotteries).
402.   Fienberg, *supra* note 8, at 257–58.
403.   ELSTER, *supra* note 3, at 42.
404.   *Id.* at 41–42.
405.   DEBORAH J. BENNETT, RANDOMNESS 141–42 (1998).
406.   Boyce, *supra* note 24, at 469–70.

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discrimination.[407] We have touched on circumvention tactics but have not elaborated due to space limits and because our discussion of this matter with respect to FIFO in a previous paper applies *mutatis mutandis*. We only note that, assuming some form of preselection, transferring the resource or the burden among people who have met the eligibility threshold may be more acceptable than a transfer to a non-eligible party.[408]

Paul Freund, the prominent American jurist, wrote almost half a century ago that "[r]andomness as a moral principle deserves serious study."[409] We have endeavored to undertake this ambitious task. To be sure, this Article does not aspire to conclude the debate over the use of lotteries in law. However, we hope it will serve as the primary springboard for scholars and policymakers contemplating random allocation.

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407. *See* Kenneth J. Heineman, *The Silent Majority*, *in* VIETNAM WAR ERA: PEOPLE AND PERSPECTIVES 79, 83 (Mitchell K. Hall ed., 2009) (explaining that while only 17% of college students came from working-class families, 80% of U.S. soldiers in Vietnam were working-class youths).

408. *See* Sher, *supra* note 139, at 213 ("[N]o one without the strongest claim to *G* may delegate *G* as he pleases . . . no person different from [those with the strongest claims] can legitimately take any step aimed at awarding *G* to a person or type of person whom he, but not all the claimants, favors.").

409. Paul A. Freund, *Introduction to the Issue "Ethical Aspects of Experimentation with Human Subjects,"* 98 DAEDALUS viii, xiii (1969).