



What Makes FRAND Fair?  
The Just Price, Contract Formation, and  
the Division of Surplus from Voluntary Exchange

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Long before anyone understood what an economist does and why it might matter, Saint Thomas Aquinas had already endeavored to define “the just price.”<sup>1</sup> Today, the adjective “just” pervades public utility statutes, as in “just and reasonable” rates,<sup>2</sup> and since 1791 the U.S. Constitution has promised “just compensation” for the government’s confiscation of private property for a public purpose<sup>3</sup>—a pricing concept which Justice Felix Frankfurter in 1948 explicitly analyzed in the terms of a hypothetically voluntary negotiation.<sup>4</sup>

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<sup>1</sup> ST. THOMAS AQUINAS, *THE SUMMA THEOLOGICA* bk. II, ii, question 77, art. I, arg. III (Benziger Bros. ed. 1947) (1265–74) (concurrent English-Latin version translated by Fathers of the English Dominican Province), <http://dhspriority.org/thomas/summa/>. Some scholars refer to the “Thomist” theory of the just price, but I will call it the “Aquinian” theory of the just price.

<sup>2</sup> See J. Gregory Sidak, *Fair and Unfair Discrimination in Royalties for Standard-Essential Patents Encumbered by a FRAND or RAND Commitment*, 2 *CRITERION J. ON INNOVATION* 301, 348–53 (2017) (discussing “just and reasonable” rates in regulated network industries such as telecommunications and energy); William Boyd, *Just Price, Public Utility, and the Long History of Economic Regulation in America*, 35 *YALE J. ON REG.* 721 (2018).

<sup>3</sup> U.S. CONST. amend. V.

<sup>4</sup> *Kimball Laundry Co. v. United States*, 338 U.S. 1, 6 (1948) (Frankfurter, J.) (“[S]ince a transfer brought about by eminent domain is not a voluntary exchange, this amount can be determined only by a guess, as well informed as possible, as to what the equivalent would probably have been had a voluntary exchange taken place. If exchanges of similar property have been frequent, the inference is strong that the equivalent arrived at by the haggling of the market would probably have been offered and accepted, and it is thus that the ‘market price’ becomes so important a standard of reference. But when the property is of a kind seldom exchanged, it has no ‘market price,’ and then recourse must be had to other means of ascertaining value, including even value to the owner as indicative of value to other potential owners enjoying the same

The economic analysis underlying the calculation of just compensation for a taking mirrors the analysis that the federal courts subsequently announced for calculating a “reasonable royalty” for patent infringement,<sup>5</sup> pursuant to section 284 of the Patent Act.<sup>6</sup>

Seven centuries after Aquinas opined on the just price there emerged a new institution of capitalism, the standard-setting organization (SSO), which by contract typically obligates the owner of standard-essential patents (SEPs) to offer to license its SEPs on fair, reasonable, and nondiscriminatory (FRAND) terms to willing implementers of the standard.<sup>7</sup> (It is notable that some SSOs require that licenses to SEPs be offered on merely reasonable and nondiscriminatory (RAND) terms.) SSOs generally permit each SEP holder to set a FRAND royalty for its SEPs through private bilateral negotiations with each implementer, rather than require the SEP holder to post tariffed rates for all customers. Such voluntary exchange benefits both parties, who divide their aggregate gains from trade, which economists call surplus.<sup>8</sup> This economic principle—that voluntary exchange is mutually beneficial—is as profound as it is simple, and for that reason economists call it, “The Fundamental Theorem of Exchange.”<sup>9</sup>

In any negotiation, the total surplus from a successful transaction is equivalent to the bargaining range—the distance between the buyer’s maximum willingness to pay and the seller’s minimum willingness to accept. Put differently, the gains from trade (that is, the gains from voluntary exchange) consist of the sum of consumer surplus and producer surplus.<sup>10</sup> As Jack Hirshleifer, Amihai Glazer, and David Hirshleifer emphasize in their pellucid undergraduate textbook on price theory, this terminology about consumption and production should not detract from the essential characteristic of voluntary exchange: “The names of these measures are somewhat misleading. The benefits stem *from trading*, not from consuming or producing. Instead of Consumer Surplus and Producer Surplus one should, properly speaking, refer

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rights.” (footnote omitted); *id.* at 6 n.3 (“In view of the resulting necessity of postulating a hypothetical sale, care must be taken to avoid the extremes, on the one hand, of excluding the value of the property for special uses and, on the other, of supposing the hypothetical purchaser to have either the same idiosyncrasies as the owner . . . or the same opportunities for use of the property as a taker armed with the power of eminent domain.”).

<sup>5</sup> See *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff’d*, 446 F.2d 295 (2d Cir. 1971); see also J. Gregory Sidak, *Is Harm Ever Irreparable?*, 2 CRITERION J. ON INNOVATION 7, 10 (2017) (Inaugural Address for the Ronald Coase Professorship in Law and Economics, Tilburg University, Tilburg, The Netherlands (Sept. 16, 2011)).

<sup>6</sup> 35 U.S.C. § 284.

<sup>7</sup> See J. Gregory Sidak, *The Meaning of FRAND, Part I: Royalties*, 9 J. COMPETITION L. & ECON. 931 (2013); J. Gregory Sidak, *The FRAND Contract*, 3 CRITERION J. ON INNOVATION 1 (2018).

<sup>8</sup> See Sidak, *Fair and Unfair Discrimination in Royalties for Standard-Essential Patents Encumbered by a FRAND or RAND Commitment*, *supra* note 2, at 333–34; J. Gregory Sidak, *Bargaining Power and Patent Damages*, 19 STAN. TECH. L. REV. 1, 20–22 (2015).

<sup>9</sup> See, e.g., JACK HIRSHLEIFER, AMIHAI GLAZER & DAVID HIRSHLEIFER, *PRICE THEORY AND APPLICATIONS: DECISIONS, MARKETS, AND INFORMATION* 203 (Cambridge Univ. Press 7th ed. 2005).

<sup>10</sup> See, e.g., *id.* at 203–04.

to Buyer Surplus and Seller Surplus.”<sup>11</sup> Elsewhere within economics, auction theory uses still other terminology—the reserve price or reservation price—to identify the same concepts, respectively, of the seller’s minimum willingness to accept and the buyer’s maximum willingness to pay.<sup>12</sup>

One question regarding the bilateral negotiation of SEPs on FRAND terms has received surprisingly little attention in either court decisions or scholarly writings: what is a fair division of the surplus generated by a voluntary negotiation successfully concluded between the SEP holder and the implementer?<sup>13</sup> John Rawls famously argued that “fair” means “just.”<sup>14</sup> “Justice as fairness,” he asserted, “is an example of . . . a contract theory.”<sup>15</sup> Rawls argued that “[t]he word ‘contract’ suggests,” among other things, “the condition that the appropriate division of advantages must be in accordance with principles acceptable to all parties.”<sup>16</sup> One would expect the same of the FRAND contract. So perhaps it is a small step to suggest here that

<sup>11</sup> *Id.* at 204 n.4 (emphasis in original); see also ARMEN A. ALCHIAN & WILLIAM R. ALLEN, EXCHANGE AND PRODUCTION: COMPETITION, COORDINATION, AND CONTROL 48–49 (Wadsworth 3d ed. 1983) (demonstrating that the total surplus in a negotiation is the sum of the *seller’s* gain from trade and the *buyer’s* gain from trade).

<sup>12</sup> See Ian Steedman, *Reservation Price and Reservation Demand*, in 4 THE NEW PALGRAVE: A DICTIONARY OF ECONOMICS 158 (John Eatwell, Murray Milgate & Peter Newman eds., Macmillan 1987); see also PAUL KLEMPERER, AUCTIONS: THEORY AND PRACTICE 18, 109, 112 (Princeton Univ. Press 2004); PAUL MILGROM, PUTTING AUCTION THEORY TO WORK 9–11 (Cambridge Univ. Press 2004); ROBERT L. PHILLIPS, PRICING AND REVENUE OPTIMIZATION 46 (Stanford Univ. Press 2005); ROBERT S. PINDYCK & DANIEL L. RUBINFELD, MICROECONOMICS 393, 510–11 (Pearson 9th ed. 2018); JOHN G. RILEY, ESSENTIAL MICROECONOMICS 451–56 (Cambridge Univ. Press 2012); Garrett J. van Ryzin, *Models of Demand*, in THE OXFORD HANDBOOK OF PRICING MANAGEMENT 340, 342–43 (Özalp Özer & Robert Phillips eds., Oxford Univ. Press 2012).

<sup>13</sup> Two recent handbooks published by the Cambridge University Press concerning SEPs do not explain how fairness constrains the calculation of a FRAND royalty. See PATENT REMEDIES AND COMPLEX PRODUCTS: TOWARD A GLOBAL CONSENSUS (C. Bradford Biddle, Jorge L. Contreras, Brian J. Love & Norman V. Siebrasse eds., Cambridge Univ. Press 2019); THE CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW: COMPETITION, ANTITRUST, AND PATENTS (Jorge L. Contreras ed., Cambridge Univ. Press 2017).

<sup>14</sup> JOHN RAWLS, A THEORY OF JUSTICE II (Harvard Univ. Press rev. ed. 1999) (1971); see also JOHN RAWLS, JUSTICE AS FAIRNESS: A RESTATEMENT (Erin Kelly, ed., Harvard Univ. Press 2001); John Rawls, *Justice as Fairness: Political Not Metaphysical*, 14 PHILOSOPHY & PUB. AFFAIRS 223 (1985). Rawls’ biographer, Thomas Pogge, reminds us that Rawls began *A Theory of Justice* with this proposition: “Justice is the first virtue of social institutions.” THOMAS POGGE, JOHN RAWLS: HIS LIFE AND THEORY OF JUSTICE 28 (Michelle Kosch trans., Oxford Univ. Press 2007) (quoting RAWLS, A THEORY OF JUSTICE, *supra*, at 3). Pogge then explains how this proposition relates to the making and keeping of promises. By referring to “social institutions,” Rawls

means to refer to the practices and rules that structure relationships and interactions among agents. This sense [of Rawls’ use of “social institutions”] is exemplified by a social institution of promising. Its rules lay down what interactions between two agents count as creating a promise, what promisee conduct (if any) counts as releasing the promisor from the promise, what circumstances (if any) can be invoked as justification or excuse for nonperformance, and so on.

*Id.* By Pogge’s account, Rawls’ *Theory of Justice* has greater relevance to contract interpretation than might immediately appear to be the case for a book on political philosophy.

<sup>15</sup> RAWLS, A THEORY OF JUSTICE, *supra* note 14, at 14; see also *id.* at 14–15 (“The merit of the contract terminology is that it conveys the idea that principles of justice may be conceived as principles that would be chosen by rational persons, and that in this way conceptions of justice may be explained and justified.”).

<sup>16</sup> *Id.* at 15 (emphasis added).

contemporary jurists, policymakers, and scholars might want to ask whether Aquinas' theory of "the just price," having the historical pedigree that it does, helps at all to identify a "fair" price for purposes of determining as a matter of contemporary contract law whether the SEP holder has satisfied the fairness constraint of the FRAND obligation. And, to the extent that one finds Aquinas not to be helpful, what does that conclusion tell us about the task of giving the fairness component of the FRAND contract a meaning that is intellectually rigorous in both legal and economic respects?

This question of the meaning of a fair price turns out to have very real legal ramifications in the present day. Rarely do I disagree with Judge Richard Posner, but I do with respect to his view that "fair" is surplusage in the FRAND contract. Judge Posner, sitting by designation as the trial judge in *Apple, Inc. v. Motorola, Inc.* in 2012 in the Northern District of Illinois, said that, in the context of FRAND, "the word 'fair' adds nothing to 'reasonable' and 'nondiscriminatory.'"<sup>17</sup> My previous writings have followed this convention of making no legal or economic distinction between FRAND and RAND royalties, though I have never excluded the possibility that someone might eventually make a compelling argument for why "fair" is not a throwaway word for parties to insert into a contract.<sup>18</sup> And so, I have previously analyzed at length the differences between actual FRAND contracts and actual RAND contracts with respect to how fairness creeps into the constraint to license SEPs on nondiscriminatory terms.<sup>19</sup> This article will show why courts should take the distinction between FRAND contracts and RAND contracts more seriously.

Before turning to the relevance of Aquinian thought to fair royalties for SEPs, I want to flag a related question that exceeds the scope of this article but deserves eventual attention in another. It concerns Adam Smith and the obvious relevance that *The Theory of Moral Sentiments* has to a post-Enlightenment understanding of how empathy (which Smith called "sympathy") informs our appreciation of voluntary exchange.<sup>20</sup> David Teece should be applauded for reminding contemporary thinkers that Smith's subsequent explication of voluntary exchange in *The Wealth of Nations*<sup>21</sup> does not regard enlightened self-interest as greed but rather as an empathetic,

<sup>17</sup> 869 F. Supp. 2d 901, 912 (N.D. Ill. 2012), *rev'd in part on other grounds*, 757 F.3d 1286 (Fed. Cir. 2014). Judge Marsha Berzon previously wrote for the Ninth Circuit that a FRAND obligation was "legally equivalent" to a RAND obligation. *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 877 n.2 (9th Cir. 2012).

<sup>18</sup> See, e.g., Sidak, *Fair and Unfair Discrimination in Royalties for Standard-Essential Patents Encumbered by a FRAND or RAND Commitment*, *supra* note 2, at 308.

<sup>19</sup> See *id.* at 308–11.

<sup>20</sup> ADAM SMITH, *THE THEORY OF MORAL SENTIMENTS* pt. I, § 1, ch. 1 (1759) ("Of Sympathy") ("How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it.")

<sup>21</sup> ADAM SMITH, *1 AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS* bk. I, ch. 2 (1776) ("It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner,

outward-regarding concern for the fortunes or miseries of others.<sup>22</sup> It is therefore not surprising that the 2003 survey article on the economics of justice in the *Journal of Economic Literature* begins by quoting Smith's concept of the impartial spectator in *The Theory of Moral Sentiments*: "No man during, either the whole course of his life, or that of any considerable part of it, ever trod steadily and uniformly in the path . . . of justice, . . . whose conduct was not principally directed by a regard to the sentiments of the supposed impartial spectator, of the great inmate of the breast, the great judge and arbiter of conduct."<sup>23</sup> Those immersed in the consequential legal disputes over the division of the returns of pathbreaking innovation might benefit from taking a moment to revisit Adam Smith's impartial spectator and Aquinas' theory of the just price.<sup>24</sup>

More than 30 years ago, Robert Frank of Cornell University proposed a precise economic definition that is directly relevant to the question of what makes a FRAND royalty fair:

Using the notions of reservation price and surplus, we can construct the following operational definition of a fair transaction: *A fair transaction is one in which the surplus is divided (approximately) equally. The transaction becomes increasingly unfair as the division increasingly deviates from equality.*<sup>25</sup>

but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our necessities but of their advantages.”)

<sup>22</sup> See David J. Teece, *The New Enlightenment* (July 1, 2019) (“With the invisible hand of the market and the pursuit of profit, prosperity is enabled. However, this is not just because of competition. It is because, in Adam Smith’s framework, the pursuit of profit is tempered by sympathy and benevolence, enforced by Smith’s ‘impartial spectator.’”). Teece’s remarks were delivered at a conference that he organized that was entitled *The New Enlightenment: Reshaping Capitalism and the Global Order in a Neo-Mercantilist World* and convened in Adam Smith’s home—Panmure House in Canongate, Edinburgh. The conference culminated with the First Panmure House Declaration, which urges “international leaders to base their policies and decision-making on a set of common principles, as espoused and formulated by Adam Smith, which cherish the required values of an ethically-based liberal democratic system, a moral commitment to the well-being of our communities and affirm responsibility to protect economic, political and social freedoms, use resources wisely, avoid unintentional consequences, follow the rule of law, favour markets and prices as guides to resource allocation and take a long term view of private and public investments, to support inclusive economic growth and prosperity for all.” *First Panmure House Declaration*, EDINBURGH BUS. SCH., <https://www.ebsglobal.net/news-and-events/first-panmure-house-declaration>.

<sup>23</sup> ADAM SMITH, *THE THEORY OF MORAL SENTIMENTS* pt. VI, § III (“Of the Character of Virtue”) (1759), quoted in James Konow, *Which Is the Fairest One of All? A Positive Analysis of Justice Theories*, 41 J. ECON. LITERATURE 1188, 1188 (2003). Elsewhere in *The Theory of Moral Sentiments*, Smith wrote that, if justice “is removed, the great, the immense fabric of human society, that fabric which to raise and support seems in this world, if I may say so, has the peculiar and darling care of Nature, must in a moment crumble into atoms.” SMITH, *THE THEORY OF MORAL SENTIMENTS*, *supra*, pt. II, § 2, ch. 3.

<sup>24</sup> To place in context the magnitude of the controversy over the division of the surplus from the creation of smartphones—to take only one example of a breakthrough innovation from only one snapshot in time—Qualcomm alone reported, for fiscal year 2018, litigation costs exceeding \$1.5 million *per day*. See J. Gregory Sidak, *Is Patent Holdup a Hoax?*, 3 CRITERION J. ON INNOVATION 401, 465–66 (2018) (analyzing Securities and Exchange Commission filings disclosing expenditures on litigation); Qualcomm Inc., Annual Report for the Fiscal Year Ended September 30, 2018 (SEC Form 10-K), at 44 (filed Nov. 7, 2018) (“[Qualcomm encountered] \$325 million in higher litigation costs, with total litigation costs of \$554 million and \$229 million in fiscal 2018 and fiscal 2017, respectively.”).

<sup>25</sup> ROBERT H. FRANK, *PASSIONS WITHIN REASON: THE STRATEGIC ROLE OF THE EMOTIONS* 165 (W. W. Norton & Co. 1988) (emphasis in original).

Frank then explained the problem that unfairness presents: “People will sometimes reject transactions in which the other party gets the lion’s share of the surplus, even though the price at which the product sells may compare favorably with their own reservation price.”<sup>26</sup> This reasoning is very close to the conclusion I had reached before benefiting, late in the process of revising this article over the course of several years, from reading Frank’s 1988 book. Frank and I each find ourselves using Judge Posner as our foil, though for different reasons. Frank criticized Judge Posner’s writings through the mid-1980s as denying what Frank argued was the considerable explanatory power of fairness considerations in law and economics.<sup>27</sup> In contrast, I gently chide Judge Posner for overlooking roughly 25 years later that, by the private ordering of contract law, some SSOs had chosen to impose an obligation of fairness so that (according to my economic interpretation) those SSOs could nudge parties into exercising the degree of moderation in their negotiation demands that is necessary to achieve contract formation reliably and expeditiously.

The irony is that my interpretation of why the word “fair” must have an independent meaning within the FRAND contract is quintessentially Posnerian: a division of surplus that is perceived by both parties to be fair maximizes the probability of contract formation, which in turn immediately benefits the parties to the contract. Thus, fairness clearly promotes static allocative efficiency. Moreover, across time the fairness constraint on the division of surplus also benefits countless consumers, whom the grand edifice of the FRAND contract is surely intended to benefit (though not necessarily by the formal machinery of conferring on those consumers legally enforceable rights of a third-party beneficiary, as the FRAND contract does confer on implementers). As Joseph Schumpeter taught us, it is the consumption of innovative products in the future that delivers radical—not marginal—gains in consumer surplus.<sup>28</sup> Thus, the fairness constraint promotes dynamic

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<sup>26</sup> *Id.* at 167 (emphasis suppressed).

<sup>27</sup> Frank argues that in “the self-interest model,” which he identifies with Judge Posner,

the division of the surplus simply plays no role in determining whether a transaction will take place. It will occur provided each party gets some positive share of the surplus, no matter how small. When Posner says fairness “has no content,” this feature of the traditional model must be at least in part what he has in mind. Yet, as we will presently see, concerns about fairness repeatedly cause people to reject transactions with positive surplus.

*Id.* (attributing Judge Posner’s quotation to Paul Barrett, *Influential Ideas: A Movement Called “Law and Economics” Sways Legal Circles*, WALL ST. J., Aug. 4, 1986, at 1, 16). Frank argues that Judge “Posner and other rationalists would hardly deny that people *say* they care about fairness[,] [b]ut hardheaded economists treat such statements as mere verbiage, devoid of any power to predict behavior.” *Id.* (emphasis in original).

<sup>28</sup> See J. Gregory Sidak & David J. Teece, *Dynamic Competition in Antitrust Law*, 5 J. COMPETITION L. & ECON. 581, 602 (2009) (“Dynamic competition is powered by the creation and commercialization of new products, new processes, and new business models. As [Joseph] Schumpeter said, competition fueled by the introduction of new products and processes is the more powerful form of competition: ‘competition from the new commodity, the new technology, the new source of supply, the new type of organization—

efficiency as well. In this respect, Posner's emphasis on efficiency and Frank's emphasis on fairness are reconcilable. A lopsided division of surplus is a cost imposed on efficient transactions to the extent that it prevents some otherwise promising negotiations from achieving successful contract formation; if that cost can be eliminated or mitigated, a larger number of efficient transactions will occur. Therefore, regardless of whether one prefers to call it a quest for fairness or a quest for efficiency, an SSO's constraint on the SEP holder that a royalty for its SEPs be fair is a privately ordered feature of contract—a self-imposed cattle prod—that contributes to a result that proponents of fairness and proponents of efficiency can both applaud.

One can formalize a simple theory of fairness and contract formation. Imagine a decision tree depicting the expected surplus of a contract negotiation as the sum of the expected values of two mutually alternative outcomes:  $EV = pS + (1-p)0$ , where  $p$  is the probability of contract formation and  $S$  is the surplus created by a successful transaction. The size of the surplus  $S$  is separately identified by the bargaining range, which is bounded by the reservation prices of the parties to the negotiation. But the expected value of the surplus is necessarily smaller than  $S$  because the division of the surplus might cause one of the parties to walk away. A simple and intuitive formulation of the relationship comes from defining as  $R$  the ratio of the seller's share of the surplus ( $X$ ) to the buyer's share of the surplus ( $Y$ ):  $R = X/Y = X/(1-X)$ .  $R$  is bounded below by zero and above by infinity. As  $R$  approaches zero,  $p$  approaches zero. As  $R$  approaches infinity,  $p$  again approaches zero. In either case, it becomes more likely that contract formation will fail, and consequently the parties will forfeit the surplus from the transaction.

At this point, it is instructive to consider the Ultimatum Game, a bargaining game in which a player makes a single take-it-or-leave-it offer, rather than multiple offers and counteroffers.<sup>29</sup> The game ends in either an agreement to the unaltered terms of the first offer or no agreement at all. If the second party rejects the offer, neither party benefits—the first party does not keep any portion of the asset but rather forfeits it all. Thus, both parties have an incentive to agree, and the division of surplus (which in this particular game is assumed to be a windfall, not a return on either party's investment) will depend on a fair offer. As I previously explained in 2013, the Ultimatum Game is interesting in analyzing the FRAND contract not because a FRAND

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competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the output of existing firms, but at their foundations and their very lives.' Advocates of strong competition policy must surely favor dynamic competition, for static competition is anemic in comparison.") (quoting JOSEPH A. SCHUMPETER, *CAPITALISM, SOCIALISM AND DEMOCRACY* 8 (Harper 1942)).

<sup>29</sup> See Richard H. Thaler, *Anomalies: The Ultimatum Game*, 2 J. ECON. PERSP., Autumn 1988, at 195.

negotiation represents an Ultimatum Game.<sup>30</sup> After all, in FRAND licensing there are typically repeated rounds of offer and counteroffer, the identities of the parties are known (perhaps because the parties have previously negotiated a licensing contract), and the reputation of the players matters because they will face the prospect of repeated play in subsequent licensing over future standards. Instead, the Ultimatum Game is interesting for FRAND licensing because the results of economic experiments based on the Ultimatum Game shed light on which divisions of surplus the parties to a stylized negotiation would consider fair. Surveying the experimental economics literature as it existed in 2000, Ernst Fehr and Simon Gächter reported that “[a] robust result in [the Ultimatum Game] experiment, across hundreds of trials, is that Proposers who offer the Responder less than 30 percent of the available sum are rejected with a very high probability.”<sup>31</sup>

If there are any positive spillovers for society as a whole from successful contract formation, as there of course would be if the contract is one for the licensing of patents essential to practice an industry standard, then those externalities are forfeited as well when the negotiation collapses. In contrast to the scenarios of negotiation impasse described above, as  $R$  goes to one,  $p$  approaches one, and thus contract formation becomes increasingly certain. An impartial spectator (or a saintly price theorist) nudging the parties to maximize the expected value of the surplus of their contemplated transaction would prescribe “maximize  $p$  with respect to  $R$ ,” since  $S$  is already exogenously determined.

This article shows how the contemporary debates and controversies over FRAND licensing of SEPs raise fundamental questions about the relationship of justice or fairness to voluntary exchange. Those questions have intrigued political philosophers since the Enlightenment and earlier, and they continue to intrigue contemporary economists, game theorists, and jurists. In the introduction to their edited volume, *Fairness in Law and Economics*, Lee Anne Fennell and Richard McAdams observe that “fair distribution—and fair processes of distribution—may be a necessary step toward maximizing wealth. Fairness perception and the consequences of perceived unfairness can profoundly influence all of the activities and choices

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<sup>30</sup> See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 7, at 1047. In 2013, I said that the Ultimatum Game sheds light on the reasonableness of an offer as well. *Id.* As a result of writing this article, I no longer believe that proposition to be correct; I have concluded instead that the reasonableness component of the FRAND (or RAND) obligation concerns the identification of the size of the surplus, not the question of how the parties will find it mutually acceptable to divide the surplus.

<sup>31</sup> Ernst Fehr & Simon Gächter, *Fairness and Retaliation: The Economics of Reciprocity Source*, 14 J. ECON. PERSP., Summer 2000, at 159, 161 (citing Werner Güth, Rolf Schmittberger & Bernd Schwarze, *An Experimental Analysis of Ultimatum Bargaining*, 3 J. ECON. BEHAVIOR & ORG. 367 (1982); Colin Camerer & Richard Thaler, *Anomalies: Ultimatums, Dictators and Manners*, 9 J. ECON. PERSP., Spring 1995, at 209; Alvin E. Roth, *Bargaining Experiments*, in 1 THE HANDBOOK OF EXPERIMENTAL ECONOMICS 253 (John H. Kagel & Alvin E. Roth eds., Princeton Univ. Press 1995)). A 29-71 split of the surplus would correspond to a value of  $R$  equal to 0.41.

that would otherwise make the pie grow, from cooperating, to bargaining, to settling disputes, to complying with the law.”<sup>32</sup> This conjecture seems plausible and intuitive when they expressly link it to economic efficiency, in either its allocative or dynamic dimension: “If we wait until pie-slicing time to make things fair, we might find ourselves slicing a smaller pie.”<sup>33</sup>

I begin, in Part I, by showing that Aquinas’ just price resembles the price emerging from voluntary exchange rather than a regulated price resulting from involuntary exchange, such as compulsory licensing. Furthermore, Aquinas understood the just price to lie along a range of acceptable prices, rather than to occupy a unique point. Put differently, the correct reading of Aquinas is that he identified *a* just price, not *the* just price. These two insights correspond to questions of contract law or patent law that currently confront courts in disputes over FRAND royalties.

In Part II, I propose an understanding of the fairness constraint in the FRAND obligation. One can view fairness as being not an end in itself but rather a means to an end—namely, the successful negotiation of a welfare-enhancing voluntary exchange of patented technology that results in contract formation between the SEP holder and the implementer. According to this account, the fairness constraint in the FRAND commitment is a lubricant to achieving the economic efficiency inherent in a successful bargain. Requiring fairness in the pricing of SEPs dissuades both the SEP holder and the implementer from (irrationally) walking away from a voluntary, bilateral licensing negotiation that, if successful, would create a positive surplus. In this sense, the fairness constraint in a FRAND contract makes an incremental contribution to constraining the pricing of FRAND-committed SEPs, above and beyond the respective constraints that reasonableness and nondiscrimination impose.

In Part III, I briefly remark on the relationship between fairness and time. I discuss the economic significance of the legal adage, “Time is of the essence,” which I consider relevant to the division of surplus and thus to the expeditious contract formation for the licensing of SEPs. Unfortunately,

<sup>32</sup> FAIRNESS IN LAW AND ECONOMICS, at xvi (Lee Anne Fennell & Richard H. McAdams eds., Edward Elgar 2013).

<sup>33</sup> *Id.* However, I disagree with Fennell and McAdams on the extent to which this conjecture retains empirical plausibility of general application. They say, for example, “we should expect more crime, and particularly more theft, if there is unequal distribution of wealth, so a ‘fair’ distribution might be necessary to reduce crime and thereby maximize wealth.” *Id.* I doubt both halves of that conjecture. Voluntary exchange qualitatively differs from involuntary exchange. For example, the common law places responsibility for consequential harm differently, depending on the degree to which the exchange is voluntary or involuntary. See J. Gregory Sidak, *Two Economic Rationales for Felony Murder*, 101 CORNELL L. REV. ONLINE 51, 54–58 (2016). Furthermore, the income elasticity of theft is an empirical question. The implicit assumption of Fennell and McAdams is that theft is an inferior good. Yet, the WorldCom fraud, to take only one example, might cause some to doubt the conjecture that a person can become too rich to steal. See J. Gregory Sidak, *The Failure of Good Intentions: The WorldCom Fraud and the Collapse of American Telecommunications After Deregulation*, 20 YALE J. ON REG. 207 (2003).

recognition of that economic relevance has eluded the courts in the reported decisions on FRAND licensing disputes.

In Part IV, I explain that, although any possible division of the surplus created by voluntary exchange is mutually beneficial, that fact does not imply that every price along the bargaining range (which defines the locus of “reasonable” royalties) is equally likely to yield an agreement. How does a given split of the surplus between the SEP holder and the implementer influence the probability of their successful contract formation within a specified period of time? One interpretation of a fair royalty is that it leads more expeditiously to contract formation than some other division of the gains from trade. That is, the fairness component of the FRAND contract between the SEP holder and the SSO takes on independent meaning by giving teeth to the proposition that time is of the essence in achieving contract formation between the SEP holder and the implementer. Justice (or fairness)—apart from being a virtue in itself—promotes economic efficiency in the sense of hastening voluntary exchange, which is the prerequisite to the expeditious exploitation of the standard.

#### I. VOLUNTARY EXCHANGE AND THE JUST PRICE

The concept of “justice” and the determination of what is “fair” have sparked intellectual inquiry and debate since the dawn of civilization. Over four millennia ago in Babylon, Hammurabi’s Code attempted “to cause justice to prevail in the land” by setting forth guidelines for human interactions.<sup>34</sup> Although Hammurabi’s support for retributive violence as compensation for harm is no longer relevant in most societies today, reviewing the works of scholars, philosophers, theologians, and economists—both before and after Aquinas—is a productive exercise that can inform modern debates over particular disputes or transactions that implicate justice or fairness. Although many have opined on justice throughout history—from Hammurabi to Aristotle to St. Augustine—the analysis of justice as it relates to business practices became most relevant with the emergence of the market economy in the West in the Medieval Era.<sup>35</sup> Aquinas was one of the first and most influential scholastic thinkers to consider what constitutes a fair exchange in a

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<sup>34</sup> THE CODE OF HAMMURABI, KING OF BABYLON: ABOUT 2250 B.C., at 3 (Robert Francis Harper ed. & trans., Univ. of Chicago Press 2d ed. 1904) (“Anu and Bel called me, Hammurabi . . . to cause justice to prevail in the land, to destroy the wicked and the evil, to prevent the strong from oppressing the weak, . . . to enlighten the land and to further the welfare of the people.”).

<sup>35</sup> See David Vogel, *The Ethical Roots of Business Ethics*, 1 BUS. ETHICS Q. 101, 101 (1991).

market economy—what he calls the “just price”—and for that reason, those interested in that topic have often turned to his writings for guidance.<sup>36</sup>

### A. *Intuiting How Voluntary Exchange Creates Surplus*

Under medieval Catholic theology, one could not be a businessman and also be pleasing to God.<sup>37</sup> David Vogel argues that Aquinas himself “regarded most forms of trade conducted for profit as inherently morally suspect.”<sup>38</sup> The Protestant Reformation therefore played a crucial role in the development of capitalism, as it allowed one to be both a successful businessman *and* a morally righteous person.<sup>39</sup> Further, participation in the market proved not to be a zero-sum game, but rather a system that could benefit all participants.<sup>40</sup> Vogel argues that “[w]hat capitalism did was make money-making ethical.”<sup>41</sup> For Vogel, the most important aspect of justifying the pursuit of profit was that those who profited were *deserving* of the profits they received.<sup>42</sup> The wealth one accumulates is considered to be fair because it reflects the value that the individual (or firm) provides to society.

#### 1. *Aristotelian Moderation and Subjective Value*

Despite predating the Protestant Reformation, Aquinas’ analysis of the just price remains influential today. The *Summa Theologica* has provided the foundation for modern scholarly discourse on what constitutes a fair price in a transaction, with many still promoting the Aquinian just price (or at least their interpretation of it) as the best method for determining a fair price.<sup>43</sup>

<sup>36</sup> See Daryl Koehn & Barry Wilbratte, *A Defense of a Thomistic Concept of the Just Price*, 22 BUS. ETHICS Q. 501, 501 (2012); see also Richard Sturn, *Agency, Exchange, and Power in Scholastic Thought*, 24 EUR. J. HIST. ECON. THOUGHT 640, 658, 660 (2017).

<sup>37</sup> Vogel, *The Ethical Roots of Business Ethics*, *supra* note 35, at 103.

<sup>38</sup> *Id.*

<sup>39</sup> *Id.* at 104 (“It was by morally sanctifying the pursuit of profit that Protestantism made business ethics possible. While traditional Christian theology viewed work at worst as a curse and at best as a distraction, Protestantism held that what a businessman did between ‘9 and 5’ could be pleasing to God. Not only could one serve God by working, but also that the correct use of wealth was precisely to improve it for the glory of God. Consequently, the pursuit of profit and the pursuit of heaven become not only compatible, but mutually reinforcing. A diligent worker was less likely to be tempted by the devil. And being rewarded with financial success was now understood as a sign of God’s favor. In short, the Reformation made it possible to be both an ethical individual and a successful businessman.”).

<sup>40</sup> *Id.* at 108 (“In principle, in an economy organized according to market principles, the only way to acquire wealth is to satisfy the material needs of others; profits are the reward the businessmen [sic] receives for successfully fulfilling the legitimate expectations of his employees, customers and investors. Wealth accumulated through the market does not subtract from the total volume of goods and services available through the market system: the consumer is no more worse off for having exchanged his money for a commodity than the merchant is poorer because he now has fewer goods and more money. Thanks to the miracle of the market, both are better off than they otherwise would have been, though not necessarily in the same proportion.”).

<sup>41</sup> *Id.*

<sup>42</sup> *Id.*

<sup>43</sup> See Sturn, *Agency, Exchange, and Power in Scholastic Thought*, *supra* note 36; Juan M. Elegido, *The Just Price as the Price Obtainable in an Open Market*, 130 J. BUS. ETHICS 557 (2015); Koehn & Wilbratte, *A Defense*

Aquinas himself never explicitly defines the just price.<sup>44</sup> Scholars have therefore “draw[n] inferences from his discussion of justice and from the numerous examples he provides of unjust pricing or bargaining” to determine what they consider to be the “Thomistic just price.”<sup>45</sup>

Courts sometimes discuss the “intrinsic value” of a patent.<sup>46</sup> So do law professors.<sup>47</sup> It probably does not surprise lawyers and judges that economists generally find the concept of intrinsic value to be vacuous in light of the modern theory of consumer demand.<sup>48</sup> However, it still might surprise those same lawyers and judges to learn that in the thirteenth century Aquinas rejected the proposition that a good has intrinsic value that is independent of the subjective valuations of the buyer and seller in a market transaction. Citing Saint Augustine, he wrote that “the price of things salable does not depend on their degree of nature, since at times a horse fetches a higher price than a slave; but it depends on their usefulness to man.”<sup>49</sup> “Hence,” Aquinas observed, “it is not necessary for the seller or buyer to be cognizant of the hidden qualities of the thing sold, but only of such as render the thing adapted to man’s use, for instance, that the horse be strong, run well and so forth.”<sup>50</sup>

Aquinas built his theory of the just price on the foundation laid by Aristotle. In 1959, John Baldwin, a history professor at the University of Michigan, authored a magisterial study that traced the provenance of the theory of the just price to Aristotle’s praise of moderation:

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*of a Thomistic Concept of the Just Price, supra note 36; André Lapidus, Norm, Virtue and Information: The Just Price and Individual Behaviour in Thomas Aquinas’ Summa Theologiae, 1 EUR. J. HIST. ECON. THOUGHT 435 (1994); Vogel, The Ethical Roots of Business Ethics, supra note 35. The scholarship on the just price that has appeared over the past two decades is repetitive and delivers little incremental economic insight relative to the contributions of scholars of the mid to late 20<sup>th</sup> century.*

<sup>44</sup> Koehn & Wilbratte, *A Defense of a Thomistic Concept of the Just Price, supra note 36*, at 503.

<sup>45</sup> *Id.*

<sup>46</sup> See, e.g., *Calico Brand, Inc. v. Ameritek Imports, Inc.*, 527 F. App’x 987, 996 (Fed. Cir. 2013) (“[L]ost profits must be tied to the intrinsic value of the patented feature.”) (citing *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1548–50 (Fed. Cir. 1995) (en banc)); *Boeing Co. v. United States*, 86 Fed. Cl. 303, 314 (Fed. Cl. 2009) (referring to “the intrinsic value of the patent”).

<sup>47</sup> See, e.g., Colleen V. Chien, *From Arms Race to Marketplace: The Complex Patent Ecosystem and Its Implications for the Patent System*, 62 HASTINGS L.J. 297, 301 (2010) (“[P]atents are generally assumed to have an objective value, which can be estimated based on intrinsic qualities of a patent, such as the breadth of its claims, the amount of prior art it cites, and its prosecution history. The assumption that each patent has an intrinsic value underlies a host of policy proposals . . . .”); see also *id.* at 346.

<sup>48</sup> See, e.g., CARL MENDER, PRINCIPLES OF ECONOMICS 145–48 (James Dingwall & Bert F. Hoselitz trans., Ludwig von Mises Institute 2007) (1871) (developing the theory of subjective value).

<sup>49</sup> AQUINAS, THE SUMMA THEOLOGICA, *supra* note 1, bk. II, ii, question 77, art. II, ad. III. One still encounters fallacious arguments about intrinsic value in technologically complex debates over law and policy. For example, some engineers, opining on network neutrality, fallaciously claim that the delivery of data packets is a zero-sum game because giving priority to any one packet means delaying the delivery of another, and all packets are created equal. See J. Gregory Sidak, *A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet*, 2 J. COMPETITION L. & ECON. 349, 353 (2006).

<sup>50</sup> AQUINAS, THE SUMMA THEOLOGICA, *supra* note 1, bk. II, ii, question 77, art. II, ad. III.

As Aristotle explained carefully in the second book of the *Nicomachean Ethics*, the underlying principle of virtuous human conduct was the refraining from extreme actions. In essence[,] moral virtue was a life of moderation or the mean state, which avoided excesses and defects of human conduct. For example, in the realm of fears and confidence, courage was a virtue, because it fell between the excess of rashness or the defect of cowardliness. In giving and taking wealth, liberality was a virtue which took the middle course between prodigality and stinginess, or in the matter of social relations friendliness was a virtue which stood between flattery and quarrelsomeness. This basic ethical principle that virtue was a mean state expressed analogously in quasi-mathematical terms was to have further ramifications in a theory of justice and economic exchange.<sup>51</sup>

Virtuous self-restraint from extreme actions would be consistent with the SEP holder and the implementer both acting, perhaps in expectation of reciprocal altruism, to moderate their bid and ask prices relative to the SEP holder's minimum willingness to accept and the implementer's maximum willingness to pay. Put differently, within the Aristotelian framework of self-restraint a fairness constraint informed by the just price might not support a FRAND royalty at either boundary of the bargaining range. By this reasoning, a fair price must be an interior solution, not a corner solution.

For simplicity of exposition, I assume that no problem of discriminatory offers exists. With that simplifying assumption, the question becomes, how much does the fairness constraint of the FRAND obligation shrink the original (reasonable but not necessarily fair) bargaining range to some shorter interval? Is the fair *and* reasonable interval a large or small subset of the reasonable range? Nothing in the Aristotelian framework of self-restraint would require the fair and reasonable range to occupy a single point.

## 2. *The Adumbration of Voluntary Exchange in the Summa Theologica*

Aquinas refined the Aristotelian theory of the just price in the *Summa Theologica* in 1265–74 and is widely credited with the theory's exegesis.<sup>52</sup> It seems quaint today that left-leaning twentieth-century scholars tried to interpret Aquinas as limiting the just price to the costs of production, and that some of these scholars even argued that, by addressing the cost of labor, Aquinas anticipated the labor theory of value and Karl Marx.<sup>53</sup> Other scholars

<sup>51</sup> John W. Baldwin, *The Medieval Theories of the Just Price: Romanists, Canonists, and Theologians in the Twelfth and Thirteenth Centuries*, 49 *TRANSACTIONS AM. PHILOSOPHICAL SOC'Y* (n.s.) 1, 10 (1959).

<sup>52</sup> AQUINAS, *THE SUMMA THEOLOGICA*, *supra* note 1, bk. II, ii, question 77, art. 1, arg. III.

<sup>53</sup> SELMA HAGENAUER, *DAS "JUSTUM PRETIUM" BEI THOMAS VON AQUINO: EIN BEITRAG ZUR GESCHICHTE DER OBJEKTIVEN WERTTHEORIE* 13–16 (W. Kohlhammer 1931), *discussed in* Baldwin, *The Medieval Theories of the Just Price: Romanists, Canonists, and Theologians in the Twelfth and Thirteenth Centuries*, *supra* note 51, at 75, *and in* Raymond de Roover, *The Concept of the Just Price: Theory and Economic Policy*, 18 *J. ECON. HIST.* 418, 421 (1958). Aquinas wrote that "a man may take to trade for some public advantage,

eviscerated this conjecture by showing that Aquinas well understood the just price to be a good's current market price rather than its cost of production.<sup>54</sup> The Aquinian just price therefore necessarily reflected the changing conditions of demand and supply and necessarily could vary over time as market conditions fluctuated.

Aquinas addressed more implications of the just price—such as fraud and collusion—that will not concern us here. It adds little to what economic analysis can already say about the harm from such behavior to call it “unfair” or “unjust” as well as inefficient. In contrast, the question not yet considered by courts and scholars opining on the meaning of the FRAND commitment is whether, in the name of fairness or justice, some rule constrains (or should constrain, if none exists) the division of the surplus that will be created from the successful conclusion of a voluntary, bilateral negotiation to license SEPs. I focus here on voluntary exchange at the level of an individual, bilaterally negotiated transaction.

Another misconception of the Aquinian just price is that it was price regulation resting on supposedly theological reasoning—a kind of ethically motivated precursor to public utility regulation. However, economic historians have explained that the economic substance of the theory of the just price contradicts this common misconception. Economic historian Raymond de Roover wrote in 1958:

In the view of many economists the just price is a nebulous concept invented by pious monks who knew nothing of business or economics and were blissfully unaware of market mechanisms. It is true that certain writers, Catholics and non-Catholics alike, have done their best to accredit this fairy tale and to propagate the notion that the just price, instead of being set by the allegedly blind and unconscionable forces of the market, was determined by criteria of fairness without regard to the elements of supply and demand or at least with the purpose of eliminating the evils of unrestrained competition.<sup>55</sup>

The following passage from the *Summa Theologica* confirms that Aquinas understood that voluntary exchange creates surplus for both the buyer and seller, such that the price upon which they agreed was just:

It is altogether sinful to have recourse to deceit in order to sell a thing for more than its just price, because this is to deceive one's neighbor so as to injure him. . . . But, apart from fraud, we may speak of buying and selling

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for instance, lest his country lack the necessities of life, and seek gain, not as an end, but as payment for his labor.” AQUINAS, *THE SUMMA THEOLOGICA*, *supra* note 1, bk. II, ii, question 77, art. IV, arg. III.

<sup>54</sup> See, e.g., 1 MURRAY N. ROTHBARD, *ECONOMIC THOUGHT BEFORE ADAM SMITH: AN AUSTRIAN PERSPECTIVE ON THE HISTORY OF ECONOMIC THOUGHT* 53 (1995) (Edward Elgar 2006).

<sup>55</sup> de Roover, *The Concept of the Just Price: Theory and Economic Policy*, *supra* note 53, at 418.

in two ways. First, as considered in themselves, and from this point of view, buying and selling seem to be established for the *common advantage of both parties* . . . . Secondly we may speak of buying and selling, considered as accidentally tending to the advantage of one party, and to the disadvantage of the other: for instance, when a man has great need of a certain thing, while an other man will suffer if he be without it. In such a case the just price will depend not only on the thing sold, *but on the loss which the sale brings on the seller*.<sup>56</sup>

This passage is remarkable not only because the phrase “common advantage of both parties” elegantly intuits the concept of surplus, but also because the second category of transactions that Aquinas identifies emphasizes that the just price will reflect each party’s opportunity costs of entering into the transaction. Aquinas’ example happens to focus on the seller, who will sustain some undefined “loss” by selling the good in question; but presumably the “loss” that Aquinas envisions is the seller’s opportunity cost of parting with the good, rather than some kind of marginal profit calculation for the seller that turns out to be negative because the marginal cost of production exceeds the marginal revenue. A subsequent passage confirms this interpretation by Aquinas of the just price.

In his treatise, *Economic Thought Before Adam Smith*, Murray Rothbard demolished even more explicitly than de Roover did the contention that Aquinas would cap the just price at the seller’s production cost:

[M]ost charmingly and crucially, Aquinas, in his great *Summa*, raised a question that had been discussed by Cicero. A merchant is carrying grain to a famine-stricken area. He knows that soon other merchants are following him with many more supplies of grain. *Is the merchant obliged to tell the starving citizenry of the supplies coming soon and thereby suffer a lower price, or is it all right for him to keep silent and reap the rewards of a high price?* To Cicero, the merchant was duty-bound to disclose his information and sell at a lower price. But St Thomas argued differently. Since the arrival of the later merchants was a future event and *therefore* uncertain, Aquinas declared justice did not require him to tell his customers about the impending arrival of his competitors. He could sell his own grain at the prevailing market price for that area, even though it was extremely high. Of course, Aquinas went on amiably, if the merchant wished to tell his customers anyway, that would be especially virtuous, but justice did not require him to do so. There is no starker example of Aquinas opting for the just price as the current price, determined by demand and supply, rather

<sup>56</sup> AQUINAS, *THE SUMMA THEOLOGICA*, *supra* note 1, bk. II, ii, question 77, art. I, arg. III (emphasis added).

than the cost of production (which of course did not change much from the area of abundance to the famine area).<sup>57</sup>

This passage shows that the Aquinian understanding of a just price does not imply either a constant ratio for the division of surplus between the buyer and seller, or a constant level of the buyer's maximum willingness to pay. Like Rothbard, Baldwin considered this example from Aquinas to be "of great interest because it was included in the *Summa theologiae* and represents his last word on the subject. It logically excluded any explicit theory of a cost-of-production price."<sup>58</sup>

Furthermore, notice how easily Aquinas' discussion can be adapted to the typical hypothetical negotiation framework for determining a reasonable royalty for patent infringement. The grain becomes the patented invention. The impending grain shipments by competitors become the array of noninfringing substitutes. However, although those substitutes are acceptable, they are not available—just as a design-around that has not been perfected as of the date of first infringement is not available for purposes of the hypothetical negotiation and thus does not suppress the reasonable royalty to which the patent holder is entitled.

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<sup>57</sup> I ROTHBARD, *ECONOMIC THOUGHT BEFORE ADAM SMITH: AN AUSTRIAN PERSPECTIVE ON THE HISTORY OF ECONOMIC THOUGHT*, *supra* note 54, at 53 (emphasis in original). Aquinas presented this example in these words:

Further, if one were bound to tell the faults of what one offers for sale, this would only be in order to lower the price. Now sometimes the price would be lowered for some other reason, without any defect in the thing sold: for instance, if the seller carry wheat to a place where wheat fetches a high price, knowing that many will come after him carrying wheat; because if the buyers knew this they would give a lower price. But apparently the seller need not give the buyer this information.

AQUINAS, *THE SUMMA THEOLOGICA*, *supra* note 1, bk. II, ii, question 77, art. III, arg. IV. Later, Aquinas elaborates:

The defect in a thing makes it of less value now than it seems to be: but in the case cited, the goods are expected to be of less value at a future time, on account of the arrival of other merchants, which was not foreseen by the buyers. Wherefore the seller, since he sells his goods at the price actually offered him, does not seem to act contrary to justice through not stating what is going to happen. If however he were to do so, or if he lowered his price, it would be exceedingly virtuous on his part: although he does not seem to be bound to do this as a debt of justice.

*Id.* bk. II, ii, question 77, art. III, ad. IV. Aquinas' view of fairness in this specific example differs from the findings of survey-based research conducted in the late 20<sup>th</sup> century by future Nobel laureates in economics. See Daniel Kahneman, Jack L. Knetsch & Richard H. Thaler, *Fairness as a Constraint on Profit Seeking: Entitlements in the Market*, 76 *AM. ECON. REV.* 728, 734–35 (1986). Not all scholars on the just price accept Rothbard's assessment. See, e.g., ODD LANGHOLM, *THE LEGACY OF SCHOLASTICISM IN ECONOMIC THOUGHT: ANTECEDENTS OF CHOICE AND POWER* 87 (Cambridge Univ. Press 1998) (denouncing "Rothbard's absurd notion . . . that the scholastics were 'proto-Austrians'").

<sup>58</sup> Baldwin, *The Medieval Theories of the Just Price: Romanists, Canonists, and Theologians in the Twelfth and Thirteenth Centuries*, *supra* note 51, at 49.

3. *Wojtyła's Ratification of the Aquinian Just Price as the Fruit of Voluntary Exchange*

Before moving to other topics concerning FRAND royalties and the just price, let us digress briefly to notice an impressive intellectual connection made between the economics and the theology of voluntary exchange. Two years after the fall of the Berlin Wall, the Polish priest Karol Wojtyła—better known as Pope John Paul II—confirmed unequivocally as a matter of Catholic doctrine that the Aquinian just price is the result of voluntary exchange.

*Centesimus Annus* was Wojtyła's groundbreaking encyclical in 1991 bridging economics and theology.<sup>59</sup> The *New York Times* called it “the fullest, and in many ways the most positive, treatment of the market economy in any papal document.”<sup>60</sup> Particularly remarkable is that Wojtyła wrote about *a* just price, not *the* just price, in the same passage in which he acknowledged the significance of—and the interrelationship among—intellectual property, human capital, and the mechanisms of governance of economic activity:

In our time, in particular, there exists another form of ownership which is becoming no less important than land: *the possession of know-how, technology and skill*. The wealth of the industrialized nations is based much more on this kind of ownership than on natural resources.

Mention has just been made of the fact that *people work with each other*, sharing in a “community of work” which embraces ever widening circles. A person who produces something other than for his own use generally does so in order that others may use it after they have paid a just price, mutually agreed upon through free bargaining. It is precisely the ability to foresee both the needs of others and the combinations of productive factors most adapted to satisfying those needs that constitutes another important source of wealth in modern society. Besides, many goods cannot be adequately produced through the work of an isolated individual; they require the cooperation of many people in working towards a common goal. Organizing such a productive effort, planning its duration in time, making sure that it corresponds in a positive way to the demands which it must satisfy, and taking the necessary risks—all this too is a source of wealth in today's society. In this way, the *role* of disciplined and creative *human work* and, as an essential part of that work, *initiative and entrepreneurial ability* becomes increasingly evident and decisive.<sup>61</sup>

<sup>59</sup> JOHN PAUL II, *CENTESIMUS ANNUS* [ENCYCLICAL ON THE HUNDREDTH ANNIVERSARY OF RERUM NOVARUM], May 1, 1991, [http://w2.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf\\_jp-ii\\_enc\\_01051991\\_centesimus-annus.html](http://w2.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_01051991_centesimus-annus.html).

<sup>60</sup> Peter Steinfels, *Papal Encyclical Urges Capitalism to Shed Injustices*, N.Y. TIMES, May 3, 1991. In 2001, I commented on how differently Wojtyła and the Supreme Court of the United States under the leadership of Chief Justice William Rehnquist regarded the fall of communism to be relevant (or irrelevant) to their daily work. See J. Gregory Sidak, *Mr. Justice Nemo's* Social Statics, 79 TEX. L. REV. 737 (2001).

<sup>61</sup> JOHN PAUL II, *supra* note 59, ¶ 32 (emphasis in original).

Seven centuries after Aquinas, the person authorized to pontificate on the theological meaning of a just price in fact confirmed that this concept closely corresponds to what economists have come to understand since Adam Smith's *Theory of Moral Sentiments* and *Wealth of Nations* to be the theory of voluntary exchange.<sup>62</sup>

### *B. Intuiting Why the Just Price Is Not Unique*

The just price is not a unique point. To the contrary, it permits flexibility within the bargaining range, irrespective of the changes in market conditions. Aquinas, wrote de Roover, believed that “the just price cannot be determined with precision, but can vary within a certain range, so that minor deviations do not involve any injustice.”<sup>63</sup> But the passage in the *Summa Theologica* to which de Roover cited for this proposition is not so emphatic as his paraphrasing suggests. Aquinas actually said: “the just price of things is not fixed with mathematical precision, but depends on a kind of estimate, so that a slight addition or subtraction would not seem to destroy the equality of justice.”<sup>64</sup> What then is a “slight” deviation from the estimate? Baldwin offered this answer:

A final characteristic of the just price mentioned by Thomas in his *Summa* also suggested a current price. After discussing the relationship between divine law and civil law, and after noting that even civil law did not permit free bargaining beyond the limits of *laesio enormis* [abnormal harm], he stated that the just price of divine law should also be allowed a certain flexibility. The just price could not be fixed precisely (*punctualiter*) [(terms of points)] but consisted of a rough estimation which could vary a little in each direction without violating the equality of justice. From the context of Roman law it seems possible that Thomas saw a certain similarity between the legist theories of price and those of his own. The doctrine of Roman law, as he noted correctly above, permitted a rather large “playroom” (*ultra dimidiam iusti pretii*) [(more than half a just price)] in which buyers and sellers could set their own bargains. The theological doctrine, on the other hand, narrowed this freedom to a minimum flexibility around the just price (*modica additio vel minutio*) [(slight addition or subtraction)]. There was a

<sup>62</sup> Nobel laureate Edmund Phelps has offered an economic interpretation of the morality of innovation that dovetails neatly with Wojtyła's theological interpretation in *Centesimus Annus*. See EDMUND PHELPS, *MASS FLOURISHING: HOW GRASSROOTS INNOVATION CREATED JOBS, CHALLENGE, AND CHANGE* (Princeton Univ. Press 2013); Edmund S. Phelps, *What Is Wrong with the West's Economies?*, N.Y. REV. BOOKS, Aug. 13, 2015; Edmund Phelps, *Economic Justice and the Spirit of Innovation*, FIRST THINGS, Oct. 2009. Judging from his writings, however, Phelps appears not to have noticed the complementarity between his argument and Wojtyła's pronouncement in *Centesimus Annus*.

<sup>63</sup> de Roover, *The Concept of the Just Price: Theory and Economic Policy*, *supra* note 53, at 422 (citing EARLY ECONOMIC THOUGHT: SELECTIONS FROM ECONOMIC LITERATURE PRIOR TO ADAM SMITH 56 (Arthur E. Monroe ed., Harvard Univ. Press 1948) (1930); AQUINAS, *SUMMA THEOLOGICA*, *supra* note 1, bk. II, ii, question 77, art. I, ad. I).

<sup>64</sup> AQUINAS, *SUMMA THEOLOGICA*, *supra* note 1, bk. II, ii, question 77, art. I, ad. I.

significant difference between the legal and theological theories, but it was a difference of degree and not of kind, because of the fluctuating nature of the current price on which both theories were founded.<sup>65</sup>

Thus, it would seem that Roman law permitted some negotiation along a bargaining range, and that Aquinas' theory of the just price might compel the parties to move their bid and ask inward from the boundaries of the bargaining range somewhat. However, there is no indication that the narrowing of the bargaining range would be other than symmetrical; presumably both the seller's offer and the buyer's bid would be expected to move closer to the center of the bargaining range (which of course would be defined by the surplus that a successful transaction would create).

A more fundamental question has eluded the economic historians: how would Aquinas know that the methodology that someone uses to estimate the just price is itself just, in the sense of being reliable and unbiased? Aquinas was surely thoughtful enough to appreciate the modern concepts of "garbage in, garbage out" and "junk science," even if they were discussed in some other terminology in his day. In other words, the lack of injustice in there being some unintentional measurement error cannot be the real issue. If it were, Aquinas would be making a trivial observation about innocent human error, which presents no weighty question of justice requiring saintly wisdom to answer.<sup>66</sup>

A subtler interpretation of this passage analyzed by Baldwin is that the well-intentioned tools for estimating the just price in the thirteenth century lacked precision to such an extent that they could support only a point estimate within a confidence interval. Under this interpretation, Aquinas and his contemporaries understood intuitively that they could never know with certainty whether the just price was the mean value of the distribution rather than some other point value within a specified number of standard deviations above or below the mean. This would be a probabilistic interpretation of the just range for the price. With this understanding, it would also be possible that the choice of the wrong probability distribution (one skewed in either

<sup>65</sup> Baldwin, *The Medieval Theories of the Just Price: Romanists, Canonists, and Theologians in the Twelfth and Thirteenth Centuries*, *supra* note 51, at 78; accord LANGHOLM, *THE LEGACY OF SCHOLASTICISM IN ECONOMIC THOUGHT: ANTECEDENTS OF CHOICE AND POWER*, *supra* note 57, at 103 ("The idea that the just price permits of a certain latitude, an interval on the value scale within which the exchangers are free to reach their own agreement, went some way toward reconciling the traditional patristic (and recently discovered Aristotelian) requirement of strict justice, with the Roman law principle of *laesio enormis*.").

<sup>66</sup> With respect to measuring the quantity of the good being sold, Aquinas said that, "if anyone knowingly make use of a faulty measure in selling, he is guilty of fraud, and the sale is illicit." AQUINAS, *SUMMA THEOLOGICA*, *supra* note 1, bk. II, ii, question 77, art. II, ad. I. In that case, "not only is the man guilty of a fraudulent sale, but he is also bound to restitution." *Id.* In contrast, "if . . . the foregoing defect[] be in the thing sold, and he knows nothing about this, the seller does not sin, because he does that which is unjust materially, nor is his deed unjust . . ." *Id.* "Nevertheless he is bound to compensate the buyer, when the defect comes to his knowledge." *Id.*

direction) would distort the perception of whether a given price along the range was actually just. Perhaps Aquinas understood this difficulty intuitively, for there did exist a law of evidence in his day, replete with varying burdens of proof.<sup>67</sup> But the formal mathematics of probability theory did not develop until the insights of Pascal and others in the mid-1600s.<sup>68</sup> So one should not exaggerate the plausibility of imputing such a degree of (intuitive) probabilistic foresight to Aquinas.

An even subtler interpretation of this passage from the *Summa Theologica* is that, as a matter of economic theory, no unique solution exists to the question, what is a just price? This interpretation is consistent with the understanding that, in any successful voluntary exchange, there is surplus created, which the parties must divide in a mutually satisfactory manner. Infinitely many points lie along the bargaining range—unless by remarkable coincidence the seller’s minimum willingness to accept exactly equals the buyer’s maximum willingness to pay. This interpretation is consistent with Wojtyła’s discussion in *Centesimus Annus* in 1991 of “a just price, mutually agreed upon through free bargaining.”<sup>69</sup>

I have shown elsewhere that neither an economic interpretation nor a legal interpretation of the reasonableness and nondiscrimination constraints of a FRAND contract supports the conclusion that a FRAND royalty occupies a single point rather than a range.<sup>70</sup> In 2018, the Court of Appeal of England and Wales in *Unwired Planet*<sup>71</sup> and Judge James Selna of the Central District of California in *TCL v. Ericsson*<sup>72</sup> confirmed this economic principle as a matter of law. A year earlier, the District Court of The Hague also confirmed this insight in *Archos S.A. v. Koninklijke Philips N.V.*: “It is furthermore generally accepted and can in essence also be derived from the system of the *Huawei/ZTE* judgment, that a FRAND license has a certain bandwidth. After all, it was found in the judgment that, first, the SEP-holder makes a

<sup>67</sup> See JAMES FRANKLIN, *THE SCIENCE OF CONJECTURE: EVIDENCE AND PROBABILITY BEFORE PASCAL* 12 (Johns Hopkins Univ. Press 2001).

<sup>68</sup> See *id.* at 326.

<sup>69</sup> JOHN PAUL II, *CENTESIMUS ANNUS*, *supra* note 59, ¶ 32 (emphasis added); see also *supra* text accompanying note 61.

<sup>70</sup> See J. Gregory Sidak, *Is a FRAND Royalty a Point or a Range?*, 2 *CRITERION J. ON INNOVATION* 401, 427 (2017); J. Gregory Sidak & Jeremy O. Skog, *Hedonic Prices and Patent Royalties*, 2 *CRITERION J. ON INNOVATION* 601, 601 (2017); J. Gregory Sidak, *Apportionment, FRAND Royalties, and Comparable Licenses After Ericsson v. D-Link*, 2016 *U. ILL. L. REV.* 1809, 1823, 1834.

<sup>71</sup> *Unwired Planet Int’l Ltd v. Huawei Techs. Co.* [2018] EWCA (Civ) 2344 [121] (Eng.) (“In our judgment it is unreal to suggest that two parties, acting fairly and reasonably, will necessarily arrive at precisely the same set of licence terms as two other parties, also acting fairly and reasonably and faced with the same set of circumstances. To the contrary, the reality is that a number of sets of terms may all be fair and reasonable in a given set of circumstances.”), *discussed in* J. Gregory Sidak, *Why Unwired Planet Might Revolutionize the Resolution of FRAND Licensing Disputes*, 3 *CRITERION J. ON INNOVATION* 601, 662–63 (2018).

<sup>72</sup> *TCL Comm’n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson*, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286, at \*54 (C.D. Cal. Sept. 14, 2018), *discussed in* J. Gregory Sidak, *Judge Selna’s Errors in TCL v. Ericsson Concerning Apportionment, Nondiscrimination, and Royalties Under the FRAND Contract*, 4 *CRITERION J. ON INNOVATION* 101 (2019).

FRAND offer and, subsequently, if the SEP-user finds that unacceptable, the user can make a counter-offer that must also be FRAND.”<sup>73</sup>

## II. DIVIDING SURPLUS FAIRLY

The probability of a successful voluntary exchange increases as each party signals its willingness to accept a lesser share of the surplus that the transaction will create. Thus emerges a simple understanding of fairness, which can be expressed in comparative terms: The price corresponding to a given bilateral division of the surplus from a voluntary exchange is fairer than the price corresponding to some alternative bilateral division of that surplus if the first division is more likely than the second to lead the parties to agree to a successful transaction within some specified period of time.

My proposed definition of a fair price echoes, but is not identical to, certain themes found in the economic literature examining justice and fairness. Most notably, my definition resembles the proposition that fairness requires the approximately equal division of surplus, which Robert Frank proposed in 1988 in *Passions Within Reason*.<sup>74</sup> However, my rationale for that definition differs from what I understand to be Frank’s reasoning.

### A. The Established Royalty and the Bid-Ask Spread

If standard-essential patents were bushels of wheat, one could observe a multitude of market transactions in the aggregate that would obviate the forensic attempt by expert witnesses and judges to divide the surplus between buyer and seller. The bid-ask spread would be a sliver, and that fact would be considered a virtuous indicator of market efficiency. The liquidity needs,

<sup>73</sup> Rechtbank Den Haag 8 februari 2017, ECLI:NL:RBDHA:2017:1025 ¶ 4.3 (Archos S.A./Koninklijke Philips N.V.) (Neth.) [hereinafter *Archos v. Philips*] (“Voorts wordt algemeen aangenomen en valt in wezen ook uit het systeem van de Huawei/ZTE-beslissing af te leiden, dat een FRAND-licentie een bepaalde bandbreedte kent. In die beslissing wordt immers overwogen dat eerst de SEP-houder een FRAND-aanbod doet en vervolgens, als de SEP-gebruiker zich daar niet in kan vinden, de gebruiker een tegenaanbod kan doen dat eveneens FRAND dient te zijn.” (citing Case C-170/13, Huawei Techs. Co. v. ZTE Corp., 2015 E.C.R. 477) (footnotes omitted)). I understand the Dutch court’s use of the word “bandwidth” (*bandbreedte*) in this context to express the same concept as what other courts and I have called the FRAND range. I am not aware of any scholarly literature or any court opinion that has given a different meaning to the FRAND range or the FRAND “bandwidth.”

<sup>74</sup> FRANK, *PASSIONS WITHIN REASON*, *supra* note 25, at 165. For a (now somewhat dated) survey of that literature, see Konow, *Which Is the Fairest One of All? A Positive Analysis of Justice Theories*, *supra* note 23. “Justice arguments are now widely invoked to improve theoretical and empirical analysis in nearly every field of economics,” wrote Konow in 2003, a development that “contrasts with the traditional belief of many economists that justice is chimerical or amorphous.” *Id.* at 1188. “Despite the emerging consensus in economics over the relevance of fairness, though, no . . . agreement yet exists among economists or, for that matter, among psychologists, political scientists, sociologists, or philosophers, about the proper theory of justice.” *Id.* at 1189. See also Ernst Fehr & Klaus M. Schmidt, *A Theory of Fairness, Competition and Cooperation*, 114 Q.J. ECON. 817 (1999). Earlier surveys on the economics of fairness appear in Edward Zajac’s two books. See EDWARD E. ZAJAC, *POLITICAL ECONOMY OF FAIRNESS* (MIT Press 1995); EDWARD E. ZAJAC, *FAIRNESS OR EFFICIENCY: AN INTRODUCTION TO PUBLIC UTILITY PRICING* (Ballinger 1978).

patience, and bargaining skill of any given seller would be irrelevant to the market's price formation. The idiosyncratic valuations of both the buyer and the seller also would be irrelevant. The conditions permitting an informed market price would obviate any inquiry into the outcome of a hypothetical bilateral negotiation between any two given parties at a given moment. Instead, we would simply consult the observed market price for the given asset on the day specified.

In patent law, courts call this kind of market-determined price the “established royalty” for a patent,<sup>75</sup> which by definition is almost never observed for patents in cases that advance to litigation. The reason is simple: the market-determined price of an established royalty does not permit any significant deviation to exist among the valuations that the buyer and seller each place on the patent in question. Owing to selection bias, therefore, the failed patent negotiations that sink into the bog of litigation are ones for which no market transaction is observable and no “established rate” has emerged. By extension, this absence of an established rate should be an even greater problem for a patented input that is sold as part of a larger, multicomponent product.<sup>76</sup>

### *B. One Interpretation of the Fair Division of Surplus*

For the litigated cases involving SEPs, which permit no easy reliance upon an established royalty, the court must determine how to divide fairly the surplus from licensing the SEPs. As I have argued earlier, a given interpretation of “fairness” for purposes of SEP royalties might actually be an efficiency rationale in disguise that nudges the parties toward a successful voluntary transaction when some emotion threatens to interfere with the maximization of economic surplus. By analogy, research on the Ultimatum Game suggests that emotions such as envy, anger, or spite might upset a negotiation and thus cause the parties to forgo benefits of dividing its positive surplus.<sup>77</sup> (Recall, for example, how Hal Varian, building on work by Duncan Foley,<sup>78</sup> defined a given allocation of resources as fair if it is both Pareto efficient and free from

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<sup>75</sup> See *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff'd*, 446 F.2d 295 (2d Cir. 1971).

<sup>76</sup> See J. Gregory Sidak & Jeremy O. Skog, *Hedonic Prices for Multicomponent Products*, 4 CRITERION J. ON INNOVATION 301 (2019).

<sup>77</sup> One large-scale experiment of the ultimatum game found support for the prediction that “informed, knowledgeable respondents may react to small ultimatum offers by perceiving them as unfair, feeling anger, and acting spitefully.” Madan M. Pillutla & J. Keith Murnighan, *Unfairness, Anger, and Spite: Emotional Rejections of Ultimatum Offers*, 68 ORG. BEHAVIOR & HUMAN DECISION PROCESSES 208, 208 (1996).

<sup>78</sup> Duncan K. Foley, *Resource Allocation and the Public Sector*, 7 YALE ECON. ESSAYS 45 (1967).

envy,<sup>79</sup> and William Baumol defined a “superfair” allocation of resources as one free of envy.<sup>80</sup>)

Matthew Rabin has studied how explicit consideration of fairness influences monopoly pricing.<sup>81</sup> An important caveat that he makes is that the players “make only mutually beneficial offers.”<sup>82</sup> This restriction is fortuitous for purposes of analogizing his analysis to a FRAND or RAND royalty negotiation because (in my opinion) the succinct economic meaning of the reasonableness constraint is to demand that the SEP holder’s offered price would produce a positive surplus for the offeror and for the offeree. Rabin then asks: “What is the highest price consistent with a fairness equilibrium at which this product could be sold?”<sup>83</sup> He finds that “the highest equilibrium price is lower than the conventional monopoly price when fairness is added to the equation.”<sup>84</sup> This result—which is consistent with the earlier experimental findings of Daniel Kahneman, Jack Knetsch, and Richard Thaler—implies that “a monopolist interested in maximizing profits ought not to set price at ‘the monopoly price,’ because it should take consumers’ attitudes toward fairness as a given.”<sup>85</sup>

One might conjecture that the purpose of a contractual obligation to make a “fair” division of surplus is to keep on a short leash the human emotions that might upset a mutually beneficial transaction. This interpretation of “fair” seems to be an acknowledgement that some principle ostensibly rooted in fairness is in actuality a lubricant to facilitate efficient voluntary exchange. So viewed, the constraint that a price embody fairness is in truth a means to an end. Just as a reduction in transaction costs can facilitate the expeditious conclusion of a voluntary exchange, so too can the absence of certain kinds of provocative (or strategic) behavior reduce the likelihood that one party will walk away in anger or spite from a voluntary negotiation that,

<sup>79</sup> Hal Varian wrote: “Consider the problem of dividing a fixed amount of goods among a fixed number of agents. If, in a given allocation, agent *i* prefers the bundle of agent *j* to his own, we will say *i* envies *j*. If there are no envious agents at allocation *x*, we will say *x* is *equitable*. If *x* is both pareto efficient and equitable, we will say *x* is *fair*.” Hal R. Varian, *Equity, Envy, and Efficiency*, 9 J. ECON. THEORY 63, 63 (1974) (emphasis in original); see also Konow, *Which Is the Fairest One of All? A Positive Analysis of Justice Theories*, *supra* note 23, at 1204 (“The theory of fairness with the purest economic pedigree, and the usual definition of equity in welfare economics, is the absence of envy criterion.”). But see *id.* at 1205 (“Absence of envy is questionable not only as a description of justice but also of what is meant by envy in common parlance: it seems quite possible that I would like to have another person’s allocation, but that I do not experience the resentful feeling about his advantage that the word envy typically connotes.”).

<sup>80</sup> WILLIAM J. BAUMOL, *SUPERFAIRNESS: APPLICATIONS AND THEORY* 15 (MIT Press 1986).

<sup>81</sup> See Matthew Rabin, *Incorporating Fairness into Game Theory and Economics*, 83 AM. ECON. REV. 1281, 1292 (1993).

<sup>82</sup> *Id.*

<sup>83</sup> *Id.*

<sup>84</sup> *Id.* at 1293.

<sup>85</sup> *Id.* (citing Kahneman, Knetsch & Thaler, *Fairness as a Constraint on Profit Seeking: Entitlements in the Market*, *supra* note 57; Daniel Kahneman, Jack L. Knetsch & Richard H. Thaler, *Fairness and the Assumptions of Economics*, 59 J. BUS. S285 (1986)).

if completed, would create surplus in which both parties would share.<sup>86</sup> This possibility is consistent with the observation of Kahneman, Knetsch, and Thaler in 1986 that earlier arguments by Arthur Okun, George Akerlof, and Kenneth Arrow “to account for apparent deviations from the simple model of a profit-maximizing firm is that fair behavior is instrumental to maximization of long-run profits.”<sup>87</sup> “In these approaches,” they write, “the rules of fairness define the terms of an enforceable implicit contract: Firms that behave unfairly are punished in the long run.”<sup>88</sup>

How does the FRAND commitment impose this notion of fairness? How can one ascribe fairness to the intentions of the SEP holder and the SSO in their forming of the FRAND contract? What obligation of fairness does the FRAND commitment impose on an SEP holder and an implementer that did not already exist for both parties in the counterfactual world in which no FRAND commitment exists? Does this notion of fairness imposed by the FRAND commitment apply also to a RAND commitment, in which the SEP holder does not agree to offer a willing implementer a “fair” royalty, but does agree to offer reasonable terms and to refrain from *unfair* discrimination among willing implementers? And, as an aside, do some of these same considerations shed light on the rationale for the nondiscrimination constraint in the FRAND (or RAND) contract (such as the avoidance of envy, or the possible defining of nondiscrimination as an equal share across implementers of the surplus from the voluntary transaction with the same SEP holder for the same portfolio of SEPs)?

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<sup>86</sup> A negotiation might reach an impasse because of “the tendency for parties to arrive at judgments that reflect a self-serving bias—to conflate what is fair with what benefits oneself.” Linda Babcock & George Loewenstein, *Explaining Bargaining Impasse: The Role of Self-Serving Biases*, 11 J. ECON. PERSP., Winter 1997, at 109, 110. “Such self-serving assessments of fairness,” Babcock and Loewenstein warn, “can impede negotiations and promote impasse in at least three ways.” *Id.* The first way that they describe actually results from the incorrect identification of the bargaining range owing to a false understanding of one’s true outside option: “if negotiators estimate the value of the alternatives to negotiated settlements in self-serving ways, this could rule out any chance of settlement by eliminating the contract zone (the set of agreements that both sides prefer to their reservation values).” *Id.* In contrast, the next two ways concern biases affecting the division of a positive surplus whose size is commonly understood:

Second, if disputants believe that their notion of fairness is impartial and shared by both sides, then they will interpret the other party’s aggressive bargaining not as an attempt to get what they perceive of as fair, but as a cynical and exploitative attempt to gain an unfair strategic advantage. Research in psychology and economics has shown that bargainers care not only about what the other party offers, but also about the other party’s motives. Third, negotiators are strongly averse to settling even slightly below the point they view as fair. If disputants are willing to make economic sacrifices to avoid a settlement perceived as unfair and their ideas of fairness are biased in directions that favor themselves, then bargainers who are “only trying to get what is fair” may not be able to settle their dispute.

*Id.* (citation omitted).

<sup>87</sup> Kahneman, Knetsch & Thaler, *Fairness as a Constraint on Profit Seeking: Entitlements in the Market*, *supra* note 57, at 728.

<sup>88</sup> *Id.* at 728–29.

If one introduces the certainty—or merely the likelihood—of successive rounds of voluntary exchanges between the parties, then rules of fairness that counsel against sharp-elbow practices even more powerfully resemble efficiency norms. A world-famous academic economist with a lucrative consulting practice once told me that he “always leaves money on the table.” Why? To achieve fairness and justice? Or to invite reciprocal altruism, by acting according to the Golden Rule of doing unto others as you would have them do unto you?<sup>89</sup>

Might these arguments about reciprocal altruism apply not only to contract formation, but also to SSO participation?<sup>90</sup> Fairness in executing licenses to today’s SEPs can serve as a credible commitment to one’s doing so with respect to tomorrow’s SEPs, which are currently unknown. Fairness in the execution of licenses can produce increased acceptance of the SEP holder’s technologies in future standards, increased participation by future implementers and holders of complementary SEPs, and increased probability that the standard will achieve the scale necessary to be commercially successful. Fairness might be a commitment not to pull back the veil of ignorance, and thus fairness might discourage actions such as the IEEE’s 2015 bylaw revisions, which large implementers favored and large SEP holders opposed.<sup>91</sup> Might the lack of perceived fairness at the IEEE surrounding its 2015 bylaw amendments reflect the decision at that SSO’s formation to reject FRAND pricing for RAND pricing?

### III. TIME IS OF THE ESSENCE

Fairness necessarily implicates time. Rawls’ paradigm of the original position would be pointless if not used to compare someone’s *subsequent* position. The

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<sup>89</sup> *Matthew 7:12* (“Therefore all things whatsoever ye would that men should do to you: do ye even so to them: for this is the law and the prophets.”) (King James); see also Armin Falk & Urs Fischbacher, *A Theory of Reciprocity*, 54 *GAMES & ECON. BEHAVIOR* 293 (2006). Falk and Fischbacher distinguish reciprocity from reciprocal altruism: “Importantly, reciprocity means a behavior that cannot be justified in terms of selfish and purely outcome-oriented preferences. To avoid terminological confusion let us, therefore, clarify that reciprocity is sharply distinguished from ‘reciprocal altruism.’ A reciprocal altruist is only willing to reciprocate if there are future rewards arising from reciprocal actions. In the parlance of game theory this kind of reciprocal action may be supported as an equilibrium strategy in infinitely repeated games (folk theorems) or in finitely repeated games with incomplete information.” *Id.* at 294 n.1 (citations omitted). I have previously emphasized that bilateral negotiations over FRAND or RAND royalties for (portfolios of) SEPs should be viewed as an infinitely repeated game between the SEP holder and implementers. See, e.g., Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 7, at 971; Sidak, *Is Patent Holdup a Hoax?*, *supra* note 24, at 419. Falk and Fischbacher present a formal theory of reciprocity that models “a reciprocal action . . . as the behavioral response to an action that is perceived as either kind or unkind. The central part of the theory is therefore devoted to the question *how people evaluate the kindness of an action.*” Falk & Fischbacher, *supra*, at 294 (emphasis in original).

<sup>90</sup> I thank Andrew Vassallo for posing this question.

<sup>91</sup> See J. Gregory Sidak, *The Antitrust Division’s Devaluation of Standard-Essential Patents*, 104 *GEO. L.J. ONLINE* 48 (2015); J. Gregory Sidak, *Testing for Bias to Suppress Royalties for Standard-Essential Patents*, 1 *CRITERION J. ON INNOVATION* 301 (2016).

same could be said of the Golden Rule: it invites one to imagine how he would want to be treated in the next iteration of social interaction. Put differently, to introduce time into our understanding of fairness is to define a repeated game. Reputation and empathy become important to eliciting the sustained cooperation that enables voluntary exchange, which in turn produces the surplus that enriches society. This insight returns us to the observation by Kahneman, Knetsch, and Thaler that Okun, Akerlof, and Arrow each conjectured that “fair behavior is instrumental to maximization of long-run profits.”<sup>92</sup> It is reasonable to expect that this connection between fairness, time, and surplus would animate the institutional structure of any organization that exists for the purpose of setting voluntary standards to unleash the potential of new technologies.<sup>93</sup> At the same time, Hal Varian long ago observed that “naive theories of justice that provide for a fixed social product to be divided without regard for those who contributed to the formation of that product ignore the most difficult and important problem of formalizing our notions of justice.”<sup>94</sup>

A familiar provision in a commercial contract is that “time is of the essence” with respect to the performance of one or more of the duties specified in the contract. “Where time is the essence of a contract, it means that the provision in the contract which fixes the time of performance is to be regarded as a vital term of the contract, the breach of which may operate, at the election of the party not in default, as a discharge of the contract.”<sup>95</sup> “Where there is no such express provision” that time is of the essence, “the question as to whether a delay in performance is a material breach depends upon the surrounding circumstances.”<sup>96</sup>

In FRAND licensing negotiations between the SEP holder and the implementer, one would expect that time would be of the essence. Expeditious

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<sup>92</sup> Kahneman, Knetsch & Thaler, *Fairness as a Constraint on Profit Seeking: Entitlements in the Market*, *supra* note 57, at 728.

<sup>93</sup> See, e.g., Martin A. Nowak, Karen M. Page & Karl Sigmund, *Fairness Versus Reason in the Ultimatum Game*, 289 *SCIENCE* 1773, 1773 (2000) (“[W]e develop an evolutionary approach to the Ultimatum Game. We show that fairness will evolve if the proposer can obtain some information on what deals the responder has accepted in the past. Hence, the evolution of fairness, similarly to the evolution of cooperation, is linked to reputation.”); *id.* at 1774 (“When reputation is included in the Ultimatum Game, adaptation favors fairness over reason. In this most elementary game, information on the co-player fosters the emergence of strategies that are nonrational, but promote economic exchange.”).

<sup>94</sup> Hal R. Varian, *Distributive Justice, Welfare Economics, and the Theory of Fairness*, 4 *PHIL. & PUB. AFF.* 223, 227 (1975).

<sup>95</sup> *Hopkins v. Underwood*, 247 P.2d 1000, 1002 (Colo. 1952); see also *id.* (“Performance at or within the time specified is essential before the right to require counter performance.”); *Kaiman Realty, Inc. v. Carmichael*, 655 P.2d 872, 874 (Haw. 1982) (“Whether time is truly of the essence . . . depends upon the nature of the subject matter, the purpose and object of the contract and all other relevant facts and circumstances, not upon the skill of the draftsmen.”); *accord* *Thompson v. McCann*, 762 A.2d 432, 437 (R.I. 2000).

<sup>96</sup> *Cartozian & Sons, Inc. v. Ostruske-Murphy, Inc.*, 390 P.2d 548, 551 (Wash. 1964) (citing *Jacks v. Blazer*, 235 P.2d 187 (Wash. 1951)).

and widespread adoption of a standard is critical to its commercial success.<sup>97</sup> It is therefore essential not only that the implementation of SEPs create a positive surplus to be divided among the SEP holder and the implementer, but also that their chosen division of that surplus be such as to hasten rather than impede contract formation and thus the voluntary exchange that is the prerequisite to the lawful exploitation of the fruits of the SEP holder's innovation.

Curiously, however, no FRAND contract of any SSO of which I am aware explicitly contains a "time is of the essence" provision concerning bilateral negotiation of FRAND royalties. If such a clause did exist in a FRAND contract between the SEP holder and the SSO, it would obligate the SEP holder to negotiate with implementers expeditiously. Furthermore, it is possible that such a provision could impose on the *implementer* a symmetrical duty of expeditious negotiation as a condition of the grant to that implementer of the right to enforce the FRAND contract as a third-party beneficiary. If the FRAND contract does not explicitly impose a duty of expeditious negotiation on both the SEP holder and the implementer (as a condition of making the implementer a third-party beneficiary), then the question remains whether, in defense of the rights of *consumers* as the ultimate (but unmentioned) third-party beneficiaries of the FRAND contract, a court may construe the fairness constraint of the FRAND contract to advance this same objective of expedition.

Regrettably, courts have failed to recognize this connection between a fair division of surplus and the speed of contract formation. In *TCL v. Ericsson*, for example, Judge Selna observed that, as of the commencement of that litigation, Ericsson and TCL "had already engaged in more than *six years* of negotiations" and Ericsson had "made over a *dozen* offers to TCL and multiple concessions in the process."<sup>98</sup> Regardless of whether Ericsson or TCL was to blame for that failure of expeditious contract formation, it is jarring that Judge Selna never remarked on how so much delay harms the ultimate consumers of the products implementing the standard.

#### IV. FAIRNESS AND THE PROBABILITY OF CONTRACT FORMATION

By definition, any price within the bargaining range is mutually beneficial. But that fact does not imply that every such price is equally likely to yield

<sup>97</sup> See J. Gregory Sidak, *A FRAND Contract's Intended Third-Party Beneficiary*, 1 CRITERION J. ON INNOVATION 1001, 1013 (2016).

<sup>98</sup> *TCL Comm'n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson*, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286, at \*3 (C.D. Cal. Sept. 14, 2018) (emphasis added); see also Sidak, *Judge Selna's Errors in TCL v. Ericsson Concerning Apportionment, Nondiscrimination, and Royalties Under the FRAND Contract*, *supra* note 72, at 112-13.

an agreement. How does a given split of the surplus between the SEP holder and the implementer influence the probability of their successful contract formation within a specified period of time? Is the distinguishing characteristic of a fair royalty—or a just price—that it leads more expeditiously to contract formation than some other division of the same gains from trade?

To analyze this question, let us normalize the bargaining range so that it runs from 0 to 100. Normalizing the bargaining range simplifies the application of this analysis to different prospective implementers of the SEPs belonging to a given SEP holder. A license agreement struck at a normalized price of 0 gives the implementer 100 percent of the surplus. That is, an agreement at a normalized price of 0 is equivalent to a license bearing a royalty rate equal to the SEP holder's minimum willingness to accept and not a penny more. In contrast, an agreement at a normalized price of 100 gives the SEP holder 100 percent of the surplus. That is, an agreement struck at a normalized price of 100 is equivalent to a license bearing a royalty rate equal to the implementer's maximum willingness to pay and not a penny less.

For any license agreement struck at a normalized price between 0 and 100, each party will gain some of the surplus generated. For any possible agreement at a single given normalized price between 0 and 100, some probability exists that, within a specified period of time, the implementer will accept that price and enter into an agreement, and some different probability exists that the SEP holder will accept that same price and enter into an agreement. If both parties accept the same price, then an agreement is reached, and contract formation occurs.

The probability that the implementer will agree to terms decreases as the negotiated price moves farther from the SEP holder's minimum willingness to accept and closer to the implementer's maximum willingness to pay. Conversely, the probability that the SEP holder will agree to terms increases as the negotiated price moves farther from the SEP holder's minimum willingness to accept and closer to the implementer's maximum willingness to pay. The implementer has a "bid function" that determines the implementer's probability of agreeing to terms (within a specified period of time) at any given price over the bargaining range. Similarly, the SEP holder has an "ask function" that determines the SEP holder's probability of agreeing to terms (within the same specified period of time) at any given price over the bargaining range.

If the bid function and the ask function are symmetric, then the most common agreement will occur where the parties divide the gains from trade evenly. This 50-50 outcome is merely the arithmetic implication of the bid function's being the mirror image of the ask function. It is important to emphasize that this result does not rely on the Nash bargaining solution, which predicts a 50-50 split of the surplus in a bilateral negotiation using

cooperative game theory.<sup>99</sup> Nor does this result rely on the familiar cake-cutting principle described by Rawls and others—“You cut, I choose”<sup>100</sup>—which Peyton Young notes “is fair because the outcome is envy-free.”<sup>101</sup>

However, there is no economic reason to expect that the bid function and the ask function will be symmetric. In practice, risk aversion, discount rates, or other economic factors will influence the specific shapes for the bid function and the ask function.

The point royalty within the range of reasonable royalties upon which the SEP holder and the implementer will agree—that is, how they will divide the surplus from voluntary exchange—will be determined by the parties’ relative bargaining power. The party that suffers least from delaying the agreement—that is, the party that is most patient—will typically have more bargaining power. Parties can have different levels of “patience” during a FRAND licensing negotiation while still negotiating in good faith, and it is common for SEP negotiations to take multiple years. For example, an SEP holder that lacks liquidity might need an immediate resolution of the negotiations. Or, the implementer might be on the verge of releasing a standard-compliant product and therefore quickly needs a license to the SEPs before releasing a noninfringing product. Conversely, the SEP holder might not need an immediate license to the SEPs, which would increase its bargaining power. It is

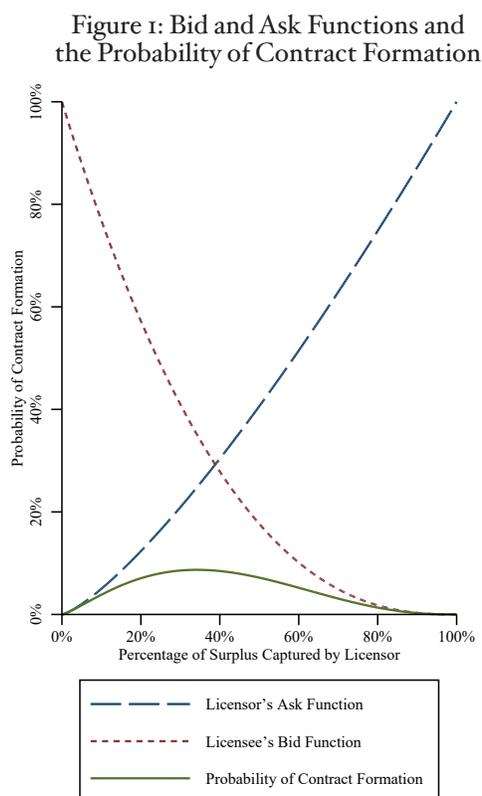
<sup>99</sup> John F. Nash, Jr., *The Bargaining Problem*, 18 *ECONOMETRICA* 155 (1950). In his 1950 article, John Nash proposed a solution to what he called the “bargaining situation”—an economic game in which two parties “have the opportunity to collaborate for mutual benefit in more than one way.” *Id.* at 155. A solution to that game maximizes “the amount of satisfaction each [party] should expect to get from the situation.” *Id.* According to Nash’s model, an increase in the value of a party’s position absent an agreement improves the party’s bargaining position and therefore results in an improvement in that party’s value of the bargain. Before deriving his solution, Nash made certain assumptions about the game’s participants: that each bargaining party is “highly rational,” “can accurately compare [its] desires for various things,” is “equal [to the other] in bargaining skill,” “has full knowledge of the tastes and preferences of the other,” and “wishes to maximize the utility to [itself] of the ultimate bargain.” *Id.* at 155, 159. Nash further assumed the independence of irrelevant alternatives—that is, if a bargainer faces a choice between *A* and *B* and prefers *A* to *B*, then that bargainer must also prefer *A* to *B* if faced with a choice between *A*, *B*, and *C*. *Id.* at 156. In 1953, Nash extended his 1950 article in a manner that “tells the players what threats they should use in negotiating.” John Nash, *Two-Person Cooperative Games*, 21 *ECONOMETRICA* 128, 130 (1953). He summarized: “Supposing *A* and *B* to be rational beings, it is essential for the success of the threat that *A* be compelled to carry out his threat *T* if *B* fails to comply. Otherwise it will have little meaning.” *Id.* (emphasis in original). American courts have been skeptical of the real-world applicability of the Nash bargaining solution as expert economic testimony and thus bristle at its invocation as a basis for predicting a 50-50 division of surplus in a bilateral negotiation. As the Federal Circuit explained in the context of measuring reasonable royalty damages for patent infringement, “[t]he Nash [bargaining] theorem arrives at a result that follows from a certain set of premises” but “itself asserts nothing” about the real-world reliability of those premises. *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1332 (Fed. Cir. 2014) (analyzing Nash, *The Bargaining Problem*, *supra*).

<sup>100</sup> See RAWLS, *A THEORY OF JUSTICE*, *supra* note 14, at 74; KEN BINMORE, *GAME THEORY AND THE SOCIAL CONTRACT: JUST PLAYING* 382–83 (MIT Press 1998); H. PEYTON YOUNG, *EQUITY IN THEORY AND PRACTICE* 135 (Princeton Univ. Press 1994); H. Peyton Young, *Dividing the Indivisible*, 38 *AM. BEHAVIORAL SCIENTIST* 904, 911–12 (1995); see also Hugo Steinhaus, *The Problem of Fair Division*, 16 *ECONOMETRICA* 101 (1948).

<sup>101</sup> YOUNG, *EQUITY IN THEORY AND PRACTICE*, *supra* note 100, at 135.

well established in the economic literature that the cost that each party bears from a delay is measured by its respective discount rate.<sup>102</sup>

Figure 1 shows illustrative bid and ask functions. The third function in Figure 1 depicts the probability that any given normalized price will result in contract formation within the specified period of time. The probability of successful contract formation for different splits of the surplus generated by the license can be used to generate a distribution of the expected normalized price, conditional on successful contract formation.



In Figure 1, the dashed line denotes the licensor's ask function, the dotted line denotes the potential licensee's bid function, and the solid line denotes the density function that represents the probability of contract formation between the licensor and the potential licensee. For ease of exposition, I do not specify the functional form of both the licensor's ask function and the potential licensee's bid function, and the density function is simply the

<sup>102</sup> See, e.g., PINDYCK & RUBINFELD, MICROECONOMICS, *supra* note 12, at 562; ROBERT GIBBONS, GAME THEORY FOR APPLIED ECONOMISTS 68–71 (Princeton Univ. Press 1992).

product of the point along the bid function and the point along the ask function that corresponds to a given division of surplus along the  $x$ -axis. A more precise model could use different assumptions concerning the probability of contract formation that might affect the density function. For example, are the probabilities for the two parties independent of one another, or is each probability conditional on the expected reaction of the counterparty (and, if so, for how many future rounds of the negotiation)? These questions are appropriate to ask if an economist wants to model the probability of contract formation in precise mathematical terms—for example, along the lines of the Rubinstein bargaining model, which is based on noncooperative game theory.<sup>103</sup> But my goal here is more modest and more heuristic. So those particulars about the precise nature of the probabilities are unnecessary to resolve to make the larger point (which I believe a judge or jury could readily understand intuitively)—namely, that it is reasonable to expect that the speed of contract formation will depend on the relative parity or disparity of the shares by which each party to a negotiation proposes to divide the surplus from a successful licensing transaction.

One proposed division of surplus might be substantially more likely than another to yield successful contract formation within a specified period of time spent negotiating. For example, it seems intuitively clear that a 60-40 split of the surplus would more readily be accepted by both parties than would a 99-1 split. If so, we would say that the 60-40 split is fairer than the 99-1 split.

What would be the threshold for a judge or jury to make the qualitative determination that a particular division of surplus would be *unfair*? Perhaps the experimental results of the Ultimatum Game, which I discussed earlier, will suggest a useful line of analysis.

#### CONCLUSION

Thomas Aquinas understood in the *Summa Theologica* that voluntary exchange produces the just price, which does not have a unique value. If, as I believe, it is more realistic to view voluntary exchange concerning the licensing of standard-essential patents as an infinitely repeated game, then one can explain the constraint of “fairness” in FRAND licensing transactions as a facilitator of efficient contract formation. This explanation does not require one to resort to any normative expression of the aesthetic features of a just or fair distribution of value within the economy. This insight also does not diminish the independent significance of fairness as a goal. To the contrary, it outlines a richer linkage between justice, innovation, and voluntary exchange than

<sup>103</sup> See Ariel Rubinstein, *Perfect Equilibrium in a Bargaining Model*, 50 *ECONOMETRICA* 97 (1982).

appears previously to have been appreciated by either jurists or scholars. And it suggests why the quest for a better understanding of the just price is as salient and profound today as it was in the 13<sup>th</sup> century.