Florida State University Law Review

Volume 51 | Issue 1 Article 2

2023

Bracing Scarcity: Can NFTs Save Digital Art?

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BRACING SCARCITY: CAN NFTS SAVE DIGITAL ART?

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ABSTRACT

Rebecca creates artwork. David mints an NFT that links to Rebecca's work. Is David making a copyright infringement? This question—probably the most fundamental one at the intersection between copyright and the technology of non-fungible tokens (NFTs)—is the focus of this Article. As surprising as this may sound, the answer is not at all obvious under extant copyright law. This Article argues that from a policy standpoint, the answer must be positive. Expounding this issue is imperative in order for NFT technology to fulfill its potential for creative works markets.

In this Article, we analyze the markets for digital artworks and show that NFTs could potentially address the most pressing and long-lasting dilemma of art and the digital world: how to maintain the incentive to create digital art without overshadowing the big promise of the Internet—to maximize access to content. This incentive-access friction was so far perceived as a necessary tradeoff in copyright theory, and the Internet presented a powerful manifestation of it. It has become a truism: the more enhanced the access to works has become online, the less likely artists were to benefit from their works. Everyone had to pick a side or draw the line somewhere on this incentive-access continuum.

NFTs may open a way to move past the incentive-access paradigm. NFT transactions occur on the blockchain—a separate, parallel platform—and they do not affect the availability of the work outside of the platform. Thus, NFTs can revive scarcity and authenticity in the digital sphere without harming access to the underlying works. While this could feature a dramatic improvement, this potential can only be

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** Senior Lecturer, Ono Academic College; Adjunct Professor, Hebrew University of Jerusalem. We completed this Article under challenging circumstances, being significantly impacted by the heinous Hamas attacks on Israel on October 7th, 2023. We extend our profound gratitude to the *Florida State University Law Review*'s editorial team for their compassion and understanding during this time. For helpful comments, suggestions, and discussions, the authors are grateful to Bita Amani, Basak Bak, Robert Brauneis, Jane Ginsburg, Orly Lobel, Hanan Mandel, Andrea Miglionico, Tyler Ochoa, Gideon Parchomovsky, Guy Rub, Michal Shur-Ofry, and Peter Yu, as well as the participants of the Smart Compliance Workshop of the Israel Science Foundation (2022), the Israeli IP Scholars Annual Workshop (2022), the Future of the Global IP System Workshop at the University of British Columbia (2023), the Intellectual Property Scholars Conference at the Cardozo School of Law (2023), and the CCLFR Research Seminar at the University of Reading (2023). For superb research assistance, the authors are grateful to Alon Aviram and Yarden Haltovsky.

realized if copyright law awards exclusive minting rights to rightsholders. If all can mint NFTs, scarcity is lost again, and artists cannot benefit from art sales.

This Article offers at least three novel contributions to the literature. First, it establishes the case for exclusive minting rights to authors based on an analysis of art markets and the attributes of NFT technology. It also shows that exclusive minting rights to authors can promote other crucial objectives such as distributive justice and cultural diversity in art markets. Second, it analyzes the legal mechanisms that can effectuate the desired result of exclusive minting rights. Third, this Article's analysis of NFTs illustrates more generally different approaches to the design of copyright law amid emerging technologies, which is a contentious and hotly debated issue.

INTRODUCTION

Rebecca creates artwork. David mints an NFT that links to Rebecca's work. Is David making a copyright infringement? This question—probably the most fundamental one at the intersection between copyright and the technology of non-fungible tokens (NFTs)—is the focus of this Article. As surprising as this may sound, the answer is not at all obvious under extant copyright law. This Article argues that from a policy standpoint, the answer must be positive. Expounding this issue can dramatically improve efficiency in the emerging NFT market.

NFTs are the latest hype in the art world. As their name implies, NFTs are "tokens," basically digital assets represented as computer code and stored on a blockchain platform, that link to other files, such

as digital artworks.[1] NFTs are non-fungible, which means that unlike other tokens, such as Bitcoin or other crypto coins, they are noninterchangeable, as each NFT contains a link to a different file.[2]

NFTs potentially address the deepest pain of digital art. Works of art, much like other types of information goods, are public goods.[3] They are non-excludable—once published, it is impossible to prevent others from accessing them, and non-rivalrous—their enjoyment by one person does not limit the ability of others to enjoy the art simultaneously.[4] Copyright law has traditionally created artificial scarcity around works of art by granting exclusive rights to creators that limited the ability of others to reproduce or distribute their work. With the advent of the Internet, which allows digital works to be easily and freely duplicated and disseminated, this artificial scarcity has become harder to enforce, as the futile fight against file sharing in the early 2000s demonstrates well.[5] As the Internet turned into a paramount platform

1. A "token" is a digital record that represents something else. *See infra* Part II.

2. It is possible to create as many NFTs as one desires to the same digital file. Technically, they will still be unique from each other, and each can be sold and transferred for a different price, with a different smart contract and various other features. *See infra* Part II.

3. *See, e.g.*, Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 281 (1970); William W. Fisher III, *Reconstructing the Fair Use Doctrine*, 101 HARV. L. REV. 1659, 1700-05 (1988); Wendy J. Gordon, *Fair Use as Market Failure: A Structural and Economic Analysis of the* Betamax *Case and Its Predecessors*, 82 COLUM. L. REV. 1600, 1610-11 (1982); William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325, 326 (1989); Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 994-99 (1997); Ofer Tur-Sinai, *The Endowment Effect in IP Transactions: The Case Against Debiasing*, 18 MICH. TELECOMM. & TECH. L. REV. 117, 129-30 (2011); Ben Depoorter & Francesco Parisi, *Fair Use and Copyright Protection: A Price Theory Explanation*, 21 INT'L REV. L. & ECON. 453, 465 n.4 (2002) (noting that "part of the collective wisdom of mainstream economic analysis" is the public good nature of creative works). *But see* Christopher S. Yoo, *Copyright and Public Good Economics: A Misunderstood Relation*, 155 U. PA. L. REV. 635 (2007) (arguing that creative works are impure public goods). *See generally* Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, *in* THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609, 614-16 (1962) (discussing intellectual property and the theory of public good). For literature on the economics of public goods, see generally RICHARD CORNES & TODD SANDLER, THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS 143-239 (2d ed. 1996); William H. Oakland, *Theory of Public Goods*, *in* 2 HANDBOOK OF PUBLIC ECONOMICS 485, 485-99, 502-22 (Alan J. Auerbach & Martin Feldstein eds., 1987).

4. Oakland, *supra* note 3, at 485; *see also* Richard A. Musgrave, *Provision for Social Goods*, *in* PUBLIC ECONOMICS: AN ANALYSIS OF PUBLIC PRODUCTION AND CONSUMPTION AND THEIR RELATIONS TO THE PRIVATE SECTORS 124, 126-29 (Julius Margolis & Henri Guitton eds., 1969); JOSHUA A.T. FAIRFIELD, OWNED: PROPERTY, PRIVACY, AND THE NEW DIGITAL SERFDOM 148 (2017) ("Rivalrousness means that if I have a thing, you don't.").

5. *See generally* Lital Helman, *Pull Too Hard and the Rope May Break: On the Secondary Liability of Technology Providers for Copyright Infringement*, 19 TEX. INTELL. PROP. L.J. 111 (2010) (analyzing the effects of applying copyrights to file sharing technology).

to consume art, this public good problem became acute, resulting in digital artists struggling to monetize their work and jeopardizing the incentive to create digital art in the first place.[6]

NFTs hold the promise to revive the scarcity of artworks in the digital arena. An NFT is an asset in and of itself and can be bought and sold independently on the blockchain, even as the work itself continues to be freely distributed on the Internet. NFTs are very much rivalrous and excludable.[7] Owing to the features of blockchains, each NFT is unique; it cannot be replicated and can only be sold to one person at a time. Akin to traditional forms of property, to acquire ownership, the NFT must leave the first owner's hold. NFTs may thus enable digital art markets to overcome the public good problem that has long plagued them and offer a way for digital artists to monetize their work.[8]

NFTs can also revive authenticity, another fundamental feature of traditional markets for creative works—in particular, for visual art—that has become mostly irrelevant on the Internet. NFTs generate authenticity by enabling the author to designate one file as original, even while copies of the file continue to be copied and distributed online.[9]

In addition to reviving scarcity and authenticity, NFTs can improve the sphere of online art in two other meaningful ways. The first way concerns a question that has bedeviled the copyright debate for a long time. Copyright scholarship has accepted as a truism the incentive-access paradigm, that is, the assumption that copyright law must strike a balance between two competing interests: authors' incentives to create, which pushes towards copyright expansion, and the public's interest to enjoy broad access to works that have already been created and disseminated.[10] The stronger the incentive pulls, the theory goes, the weaker the access privileges. And any increase in access for users will inevitably come at the expense of exclusivity and authors' incentives.

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6. *See* U.S. CONST. art. I, § 8, cl. 8 (authorizing Congress "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries").

7. *See* Michael D. Murray, *NFT Ownership and Copyrights*, 56 IND. L. REV. 367, 369-70, 383-84 (2023); Zachary L. Catanzaro, *NFT-Tethered Sound Recordings and Digital Resale*, 14 HARV. J. SPORTS & ENT. L. 17, 18-19, 25 (2023); Andres Guadamuz, *The Treachery of Images: Non-Fungible Tokens and Copyright*, 16 J. INTELL. PROP. L. & PRAC. 1367, 1371 (2021).

8. *See infra* Section II.A.

9. *See infra* Section II.A.

10. *See, e.g.*, Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 429 (1984) (stating that copyright requires "a difficult balance between the interests of authors and inventors in the control and exploitation of their writings and discoveries on the one hand, and society's competing interest in the free flow of ideas, information, and commerce on the other hand"); Landes & Posner, *supra* note 3, at 326 ("Striking the correct balance between access and incentives is the central problem in copyright law."). *But see* Christopher S. Yoo, *Copyright and Product Differentiation*, 79 N.Y.U. L. REV. 212 (2004) (arguing that product differentiation can mitigate this tension).

NFTs may pave a way to move beyond the incentive-access paradigm. NFTs create a *separate* market for tokens that signify and prove ownership and authenticity of works. At the same time, access to the works themselves remains intact. In fact, the availability of a parallel flourishing art market on the blockchain might even diminish the incentive of rightsowners to invest in expensive and often futile enforcement efforts online. This could lead to greater access to works online. Simply put, while scarcity and authenticity can improve the profit prospects for artists and enable collectors to safely invest in digital art "on-chain," the work itself can continue to be freely disseminated "off-chain." This duality can enable moving beyond the incentive-access paradigm and avoiding what has often been viewed as an unavoidable zero-sum game between authors' interests and the public domain.

The second additional benefit of a robust NFT market is its potential to reduce access barriers to art markets and alleviate the dependency on intermediaries who act as gatekeepers. In recent years, copyright scholarship has drifted away from the prism that copyright should merely enhance the incentives to create generally towards a more nuanced approach that examines diversity and inclusiveness of such incentives.[11] As we show below, NFT markets surmount some of the most tenacious hurdles that have traditionally faced marginalized artists, thus promoting wide participation and diversity in the art world.[12]

Whether NFTs are going to achieve these goals depends on a wide range of market, technological, and social factors, and we are not making any prediction regarding the future trajectory of this market. The NFT market is speculative, and many questions related thereto, both legal and others, are yet to be resolved. Yet one thing is clear. To the extent NFTs stand a chance to fulfill these promises, it is only if the creators of the underlying works of art are the sole parties permitted to mint NFTs for their works.[13] Without exclusivity, digital artists would continue facing the public good problem as much as they did before, and the potential benefits of NFTs would not be realized.

The question is how this desired legal effect—exclusive minting rights—can be achieved. A copyright owner has only a set of exclusive

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11. Clearly, noneconomic justifications for copyright have long been around. *See generally* William W. Fisher III, *Theories of Intellectual Property*, *in* NEW ESSAYS IN THE LEGAL AND POLITICAL THEORY OF PROPERTY 168, 170-73, 184-94 (Stephen R. Munzer ed., 2001).

12. *See infra* Section II.B.

13. Copyright law's default rule regarding ownership grants the initial copyrights to authors in most cases. *See* 17 U.S.C. § 201(a) ("Copyright in a work protected under this title vests initially in the author or authors of the work."). Exceptions include, inter alia, the work for hire doctrine in the United States and employment contexts around the world. Authors can also transfer rights to third parties. Because copyright is mostly bestowed upon authors as a default, for the purposes of this Article, we use the terms authors and copyright holders interchangeably, although distinguishing between the two may be needed for various policy decisions.

rights that are specifically enumerated in section 106 of the Copyright Act.[14] Obviously, a specific right to mint an NFT is not one of those enumerated rights. Minting an NFT also does not clearly, if at all, fall within the scope of the exclusive rights that are enumerated in section 106. In fact, for the most part, and as will be further discussed below, copyright law does not prevent linking to copyrighted materials, and an NFT, at the end of the day, is nothing but a link on the blockchain.[15]

Could there be other ways to harness copyright law to advance the policy objective of exclusive minting rights? First, maybe copyright can come to the rescue, from a different angle. While at its core, NFT minting may be beyond the reach of copyright law, related NFT practices typically require reproduction, display, and distribution of the underlying work. After all, a potential NFT trader needs to advertise the NFT, offer it for sale, and brag about owning it. Yet, as we discuss below, policymaking through ancillary activities can be destructive. Such regulation is not only likely to be ineffective in curbing infringement, but it also represents waste, opportunity costs, and inefficient use of innovative resources, which are directed towards avoiding liability.[16]

If copyright law cannot presently ban the unauthorized minting of NFTs, what other legal doctrines can yield this effect? As we discuss below, it is unlikely that minting and selling an NFT of a digital artwork would generate a claim for violation of moral rights under the Visual Arts Rights Act.[17] However, in some cases, unauthorized minting may trigger liability under state law, with possible causes of action being misrepresentation, claims based on tort or contract law against the seller for misleading the buyer, and others.[18]

Ultimately, while some of the legal tools we discuss in the Article can be used in certain contexts to regulate unauthorized minting, we find that they may not be adequate to fully achieve this Article's proposed policy. Recognizing the gap between the desired policy and the current state of the law is crucial for encouraging policymakers and legal scholars to continue thinking about ways to bridge this gap and effectively regulate the NFT space. Notably, the challenges arising out of the need to use extant copyright law to regulate new technologies that have a significant impact on copyright policy are not confined to

14. *See* Mark A. Lemley & R. Anthony Reese, *Reducing Digital Copyright Infringement Without Restricting Innovation*, 56 STAN. L. REV. 1345, 1373 (2004) ("Copyright in the United States has always been seen principally as a utilitarian response to a public goods problem.").

15. *See infra* Section III.A.

16. *See infra* Section III.A.

17. *See infra* Section III.B.

18. *See infra* Section III.C.

the NFT sphere.[19] This Article's analysis thus offers insights not only on how to address the challenges brought up by NFTs, but also, more broadly, on considerations and limitations that apply when adapting the law to new technologies.[20]

This Article addresses the pressing issue of unauthorized minting of NFTs, which, despite its significance, has been largely overlooked in current discussions at the intersection of law and technology.[21] The first goal of this Article is to establish the case that the author of a creative work should have an exclusive right to mint NFTs that link to their work. The second objective is to examine what legal mechanisms exist to effectuate this result. We conclude that while exclusive minting rights feature the right policy, strikingly, the available tools to implement this policy under the current law are unfitting to address this challenge.

The Article will unfold as follows. The first Part will discuss the problem of unauthorized NFT minting and provide the necessary legal and technological background for this Article. The second Part will set forth the normative thesis of this Article, which is that unauthorized minting should be forbidden. The third Part will propose doctrinal mechanisms to effectuate the desired result of barring unauthorized minting. A short conclusion ensues.

I. NFTS AND UNAUTHORIZED MINTING

NFTs have become the newest trend in art markets. NFTs have gained popularity in recent years as a new way for creators and collectors to monetize digital art. While the first NFT dates back to 2014,[22] it was not until 2017 that the art market began to realize the potential of this technology.[23] The NFT market peaked around the end of 2020

19. *See, e.g.*, Am. Broad. Cos., Inc. v. Aereo, Inc., 573 U.S. 431, 431 (2014) (applying copyright law in the context of unlicensed web-broadcasting of television programs); *see also* N.Y. Times Co. v. Tasini, 533 U.S. 483, 483 (2001) (discussing the inclusion in databases of copyrighted articles that originally appeared in periodicals).

20. For an example from a different context, see Ronit Levine-Schnur & Moran Ofir, *Who Shares the Sharing Economy?*, 32 S. CAL. INTERDISC. L.J. 593 (2023) (discussing regulatory challenges in the context of the sharing economy and identifying what the authors term as "a structural regulatory arbitrage" (emphasis omitted)).

21. For notable discussions of the issue, see Guadamuz, *supra* note 7, at 1378-80; Emily Behzadi, *The Fiction of NFTs and Copyright Infringement*, U. PA. L. REV. ONLINE, https://www.pennlawreview.com/2022/04/12/the-fiction-of-nfts-and-copyright-infringement/ [https://perma.cc/D4LG-HE7M] (last visited Oct. 20, 2023). For other scholarly works analyzing aspects of the interface between copyright law and NFTs, see Amy Adler, *Artificial Authenticity*, 98 N.Y.U. L. REV. 706, 711-14 (2023).

22. *See Quantum* (NFT), http://static.mccoyspace.com/gifs/quantum.gif [https://perma.cc/82NN-E29N]; Jennifer McCoy & Kevin McCoy, *Cars* (NFT), https://www.mccoyspace.com/project/126/ [https://perma.cc/5APF-6M4A].

23. The first two major NFTs, which were released in 2017, included CryptoPunks—an NFT collection of 10,000 algorithmically generated images—and CryptoKitties—NFTs of cartoon kittens that buyers can "breed" and sell. *See* Brian L. Frye, *Are CryptoPunks*

and the first half of 2021 with the release of NFTs by the National Basketball Association (NBA)[24] and the sale of an NFT of a Beeple collage for $69 million.[25] All of a sudden, NFTs have become the center of discussion—celebrated, attacked, or speculated about.[26] This is also when NFTs began to expand to many unrelated areas, ranging from ticket sales to real estate to gaming to shares in businesses.[27] Thus, it may not come as a surprise that NFT transactions plummeted in both volume and value by the end of October 2022. Yet, the forecast includes growth in many areas (though clearly not in all of them), including art markets.[28]

NFT stands for non-fungible token, which is a unique digital asset that represents ownership of a particular piece of content or work, such as artwork, music, text, and videos. Basically, everything you can link to, you can also mint an NFT of.[29] NFTs are based on blockchain technology, which provides a secure and transparent way to verify

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Copyrightable?, 2021 PEPP. L. REV. 105, 108-10 (2022); Nellie Bowles, *CryptoKitties, Explained ... Mostly*, N.Y. TIMES (Dec. 28, 2017), https://www.nytimes.com/2017/12/28/style/cryptokitties-want-a-blockchain-snuggle.html [https://perma.cc/6GYF-MQSL].

24. *See* David Gerard, *NBA Top Shot: A Short History of the Largest Mainstream NFT Project*, ATTACK 50 FOOT BLOCKCHAIN (Apr. 17, 2022), https://davidgerard.co.uk/blockchain/2022/04/17/nba-top-shot-a-short-history-of-the-largest-mainstream-nft-project/ [https://perma.cc/SDJ3-UKQQ] (reporting on the launch of Top Shot, a collectible NFT-based digital trading card project by the NBA and Dapper Labs).

25. *See* Scott Reyburn, *JPG File Sells for $69 Million, as 'NFT Mania' Gathers Pace*, N.Y. TIMES, https://www.nytimes.com/2021/03/11/arts/design/nft-auction-christies-beeple.html [https://perma.cc/K46U-TQVQ] (Mar. 25, 2021).

26. *See* Paul Vigna, *NFT Sales Are Flatlining*, WALL ST. J., https://www.wsj.com/articles/nft-sales-are-flatlining-11651552616 [https://perma.cc/3R6H-AYVQ] (May 3, 2022, 7:15 AM) ("The NFT market is collapsing."); Anthony Cuthbertson, *NFT Millionaire Beeple Says Crypto Art Is Bubble and Will 'Absolutely Go to Zero,'* INDEPENDENT (Mar. 24, 2021, 3:57 PM), https://www.independent.co.uk/tech/nft-beeple-cryptocurrency-art-b1821314.html [https://perma.cc/UW89-WTW5] (speculating that NFTs in general and the Beeple transaction in particular represent a bubble); Shanti Escalante-De Mattei, *Bloomberg's Massive Crypto Article Derides NFTs as Nothing More than a Ponzi Scheme*, ARTNEWS (Oct. 25, 2022, 2:57 PM), https://www.artnews.com/art-news/news/bloomberg-crypto-nfts-matt-levine-1234644343/ [https://perma.cc/3DDE-EGKV].

27. *See, e.g.*, EUR. PARLIAMENT, INTELLECTUAL PROPERTY RIGHTS AND DISTRIBUTED LEDGER TECHNOLOGY WITH A FOCUS ON ART NFTS AND TOKENIZED ART 18 (2022), https://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU(2022)737709_EN.pdf [https://perma.cc/VR8H-69X7] ("[N]ot only digital artworks can be tokenized, but any digital content. Such digital content may include memes, GIFs, literary works, music, videogames, trademarks/logos, inventions, but also unexpected content like a tweet on twitter.").

28. *See* Danny Parisi, *2022 Was the Year of the NFT Reality Check*, GLOSSY (Dec. 27, 2022), https://www.glossy.co/fashion/2022-was-the-year-of-the-nft-reality-check/ [https://perma.cc/MCR5-XP5N].

29. The most common standard for NFTs is ERC-721, which applies on the Ethereum blockchain. *See ERC-721 Non-Fungible Token Standard*, ETHEREUM, https://ethereum.org/en/developers/docs/standards/tokens/erc-721/ [https://perma.cc/DSF5-4VHP] (last updated June 23, 2023). For technical specifications of ERC-721, see William Entriken et al., *ERC-721: Non-Fungible Token Standard*, ETHEREUM IMPROVEMENT PROPOSALS (Jan. 24, 2018), https://eips.ethereum.org/EIPS/eip-721 [https://perma.cc/Q97T-9MSN].

ownership and authenticity of digital assets.[30] The first use case for blockchain involved Bitcoin, a digital currency, which allowed for the tracking of ownership in currencies by creating digital tokens and transacting with them on the blockchain. This token can be transferred from one owner to another through a secure and transparent process that is recorded on the blockchain.

Unlike Bitcoin or other cryptocurrency (and in fact, currency in general), where each coin is identical to the other, NFTs are not interchangeable with one another because they have unique characteristics that set them apart.[31] For that reason, NFTs are effectively used to convey ownership of specific digital files.[32] In a blockchain-based system for tracking ownership of artworks, a unique digital token can be created for each artwork. Indeed, artists have begun to create NFTs for their works to identify them as original and sell the NFT as proof of ownership. More specifically, the NFT fulfills two functions in the art world. The first is to designate one copy of a digital artwork as authentic and thus place a value onto it. The second is to verify the ownership of such a copy of the work so it can be sold on the market as a unique (and scarce) asset.

The problem is that technically, NFTs of works can be minted by anybody, not just the author or the rightsowner of the underlying work. Indeed, just as anyone can technically link to an image of

30. Blockchains are decentralized, digital ledgers that allow for secure and transparent recordkeeping of transactions. They use a combination of cryptography and consensus algorithms to verify authenticity and ownership of assets. On the blockchain, each transaction is recorded as a "block," and each block contains a unique digital signature, called a "hash," which is generated by applying a cryptographic algorithm to the transaction data. This hash serves as a unique identifier for the block and ensures that the data in the block cannot be altered without changing the hash. Each block in the blockchain is linked to the previous block through the previous block's hash. This creates a chain of blocks that is tamper-proof, as any attempt to change the data in a block would result in a change to the hash, which would then break the chain. The blockchain is maintained by a network of computers, each known as a node. These nodes work together to validate transactions and add new blocks to the chain. In order for a block to be added to the chain, a consensus mechanism is used to ensure that all nodes agree that the transaction is valid and that the block's hash is correct. Overall, the use of cryptography, decentralized consensus, and tamper-proof recordkeeping allows blockchains to verify the authenticity and ownership of assets in a decentralized way that is secure, transparent, and resistant to fraud. *See* Guadamuz, *supra* note 7, at 1368-70.

31. Bitcoin and other cryptocurrency tokens are fungible; namely, they have the same value as one another and can be subdivided into smaller units. NFTs are non-fungible because they are unique digital assets that cannot be replicated, substituted, or divided into smaller parts.

32. The uniqueness (non-fungibility) of an NFT arises from a combination of two numbers: a tokenID (generated during the NFT's creation or "minting") and a contract address (which represents the transaction protocol's (code) address stored and visible on the blockchain). Additionally, an NFT may feature other optional elements, such as the creator's wallet address (which serves to authenticate the token), a hash value (a unique hexadecimal number produced by applying an algorithm to the digital data that represents the work), and a URL link (a web address) pointing to where the digital work is stored. The NFT may also include other information, such as the title of the work, the name of the author or artist, the copyright status, and possibly even legal terms and conditions.

Vermeer's *Girl with a Pearl Earring* that they find on the web, anyone can create an NFT of that image. The difference between linking and minting would be that the NFT is an asset in and of itself, and can be transferred, sold, and bought, with or without the consent of the author.

Unauthorized minting of NFTs is the creation and circulation of NFTs without the permission of the copyright holders of the underlying works. No empirical data on the scope of unauthorized minting exists, but this phenomenon is assumed to be quite widespread.[33] The presumed broad scope of unauthorized minting should not come as a surprise. First, as mentioned, there is no technical restriction on unauthorized minting. The minting process involves locating (or uploading) a digital file on (or to) a server and creating a blockchain token that contains a link to that file. NFT marketplaces are not obligated to check NFTs that were put up for sale for proper authorization.[34] This means that technically, anyone can mint an NFT of any digital file. Minting NFTs of someone else's work can also be rather lucrative, considering that the costs of creating the underlying work have already been incurred by the author.

But the issue is deeper than solely that. Contrary to popular belief,[35] it is not at all evident on what legal basis minting of NFTs requires the consent of the rightsowner of the underlying work. It is also not apparent that on a policy level, unauthorized minting must always be forbidden. Surely, minting NFTs of works simply to piggyback on authors' creative efforts, skill, or reputation *feels* wrong. But unauthorized minting can occur in a variety of ways and is not necessarily spiteful. For example, a buyer of a copy of an artwork may believe that they

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33. *See, e.g.*, Othmane Zizi, *Why These 10 Artists Hate NFTs*, BUS. BUS. (Dec. 13, 2021, 5:58 PM), https://www.businessofbusiness.com/articles/nfts-turning-artists-into-millionaires-overnight-these-10-creators-are-against-the-hype/ [https://perma.cc/ZA5G-PPHM] (reporting that many artists have protested the unauthorized minting of NFTs of their works).

34. NFT platforms usually address unauthorized minting through notice and takedown policies. *See* EUR. PARLIAMENT, *supra* note 27, at 8 ("[M]ost NFT marketplaces pragmatically provide for a notice-and-take-down functionality.").

35. *See, e.g.*, Gregory J. Chinlund & Kelley S. Gordon, *What Are the Copyright Implications of NFTs?*, REUTERS (Oct. 29, 2021, 11:41 AM), https://www.reuters.com/legal/transactional/what-are-copyright-implications-nfts-2021-10-29/ [https://perma.cc/S63J-JT47] (warning NFT minters that the unauthorized minting of an NFT will expose creators to copyright liability); Bianca Lessard, *NFTs, Minting and Copyright: What You Should Know as an Artist*, RENNO & CO., https://www.rennoco.com/post/nfts-minting-and-copyright-what-you-should-know-as-an-artist [https://perma.cc/RNN7-P39Q] (last visited Oct. 20, 2023) ("Minting a non-original artwork or stealing art from someone else could be considered copyright infringement."); Harsch Khandelwal, *Minting, Distributing and Selling NFTs Must Involve Copyright Law*, COINTELEGRAPH (Aug. 22, 2021), https://cointelegraph.com/news/minting-distributing-and-selling-nfts-must-involve-copyright-law [https://perma.cc/LA9T-AUFQ] ("Minting an NFT typically involves storing a copy of the digital file on a server, but only the owner of the copyright in the underlying work can make copies of that work. So, unless an NFT is minted by the copyright owner (or someone operating with their permission), the act of minting the NFT is an infringement of copyright.").

possess the right to mint an NFT of that work.[36] Similarly, copyright licensees and licensors may debate who has minting rights under the license. Disputes over the right to mint NFTs may also arise in cases where the author has transferred the copyright to a third party who wishes to control the minting of NFTs of the work.[37] Likewise, Internet users may innocently mint NFTs of works that they come across, believing that they are not harming authors, perhaps because the author can tokenize the same work herself. In these—and other—cases, the appropriate legal outcome may not be obvious, and as we discuss below, copyright law lacks clear answers.[38] These doubts buttress the necessity of the inquiry undertaken below.

Is unauthorized minting a problem? The next part of the Article sets forth a normative account *against* unauthorized minting. We analyze the potential of NFTs to reinstate scarcity and authenticity online and argue that such potential can only be realized if authors are granted exclusive minting rights. We also show that exclusive minting rights to authors can produce additional advantages in the world of creativity.

II. THE NORMATIVE CASE AGAINST UNAUTHORIZED MINTING

This Part aims to set forth the normative case against unauthorized minting. It shows that granting authors the exclusive rights to mint NFTs of their works has the potential to boost their incentive to create by reinstating the concepts of scarcity and authenticity online. It then shows that while enhancing authors' rights, exclusive minting rights do not entail significant costs in terms of restricting user rights or narrowing the public domain. Finally, the analysis shows that exclusive minting rights can further additional interests in the world of creativity for the benefit of both artists and society as a whole.

A. NFTs and the Incentive to Create

The paramount economic justification underlying copyright law in the United States is utilitarian.[39] Under the utilitarian account,

36. *See, e.g.*, News Desk, *Basquiat NFT Pulled from Auction After Sparking Controversy*, ARTFORUM (Apr. 28, 2021, 1:20 PM), https://www.artforum.com/news/basquiat-nft-pulled-from-auction-after-sparking-controversy-85640 [https://perma.cc/2229-2U5Q] (reporting that the owner of a physical drawing by Jean-Michel Basquiat was prevented from minting an NFT of the drawing by the Basquiat estate, which owned the underlying copyright).

37. For example, see Complaint at 1, Miramax, LLC v. Tarantino, No. 2:21-CV-08979 (C.D. Cal. Nov. 16, 2021), a copyright and trademark lawsuit filed by production company Miramax against Quentin Tarantino over his Pulp Fiction NFTs. Tarantino is the author of the files underlying the NFTs but not their copyright owner. The case has settled.

38. *See infra* Section III.A. *See generally* Behzadi, *supra* note 21, at 4.

39. *See* U.S. CONST. art. I, § 8, cl. 8 (authorizing Congress "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries").

copyright law is designed to encourage creativity for the benefit of society.[40] Copyright law owes its existence to the public good nature of creative works. Indeed, creative works are both non-excludable, as once created and distributed, it is impossible to exclude people from consuming them, and non-rivalrous, as many can access them without harming the enjoyment of others to do the same.[41] As a result of their public good nature, there is no scarcity in creative works, and the market cannot regulate them. Copyright law tackles this market failure by generating artificial scarcity through a set of exclusive rights that forbid the copying and communication of creative works to the public. Artificial scarcity creates a market around creative works, which in turn allows authors to recoup the investment in creating the work and make a profit, thus incentivizing them to engage in creative processes. Simply put, the raison d'être of copyright law is to provide authors with exclusive rights over their works ex post in order to incentivize authors to produce creative works ex ante.[42]

To be sure, copyright comes at certain costs. In particular, bestowing property rights upon authors limits access to creative works, to the detriment of potential consumers of art and culture. Diminished access to creative works can also stifle further creativity by new authors who may wish to use existing works as raw materials for new works. Property rights in existing expressions can also, more broadly, hinder the public's freedom of speech.[43] Access to copyrighted works is fundamental to facilitate other socially beneficial uses as well, including research and education, and is a vital foundation for public discourse and democratic participation.

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40. *See* Abraham Bell & Gideon Parchomovsky, *Reconfiguring Property in Three Dimensions*, 75 U. CHI. L. REV. 1015, 1047 (2008) ("Because the initial production of intellectual goods often necessitates considerable investment and once produced they can be copied at a very low cost, there is a serious risk that not enough intellectual goods would be created without legal protection."); Julie E. Cohen, Lochner *in Cyberspace: The New Economic Orthodoxy of "Rights Management,"* 97 MICH. L. REV. 462, 471 (1998) ("By guaranteeing authors certain exclusive rights in their creative products, copyright seeks to furnish authors and publishers, respectively, with incentives to invest the effort necessary to create works and distribute them to the public."); Neil Weinstock Netanel, *Copyright and a Democratic Civil Society*, 106 YALE L.J. 283, 285 (1996) ("To encourage authors to create and disseminate original expression, [copyright law] accords them a bundle of proprietary rights in their works.").

41. *See, e.g.*, Tur-Sinai, *supra* note 3, at 129-30.

42. *See* Shyamkrishna Balganesh, *Foreseeability and Copyright Incentives*, 122 HARV. L. REV. 1569, 1577 (2009). Granted, authors may well be driven by intrinsic motivations. But if they are unable to make a living off art, they will have to devote less time to creativity. *See, e.g.*, Diane Leenheer Zimmerman, *Authorship Without Ownership: Reconsidering Incentives in a Digital Age*, 52 DEPAUL L. REV. 1121, 1137 (2003) ("Having made the point that artistic production is not only, and perhaps not even primarily, about money, it is nevertheless unlikely that writers will devote themselves as fully to authorship as a profession if they cannot profit from the value that others place on their work.").

43. *See, e.g.*, Rebecca Tushnet, Essay, *Copy This Essay: How Fair Use Doctrine Harms Free Speech and How Copying Serves It*, 114 YALE L.J. 535, 590 (2004).

Accordingly, the economic analysis of copyright law and policy is grounded in a framework known as the incentive-access paradigm.[44] The incentive-access paradigm centers around the tradeoff between the need to incentivize expressive creativity ex ante and the need to provide broad access to works that have already been created ex post.[45] The traditional wisdom presumes an inevitable tradeoff: broadening copyright's exclusive rights may increase incentives to create, but at the same time, inherently limits access to the ensuing information goods. Much of the scholarly writing and policy discussions in the area of copyright revolve around the need to structure copyright law in a manner that appropriately strikes a balance between the benefits of increased incentives and the costs of decreased access, and the optimal equilibrium point has been subject to a fierce debate. This basic policy tradeoff seems inevitable and an inherent feature of copyright law.

Except, this tradeoff may not be as inevitable in the context of NFTs. The unique characteristics of NFTs may reconcile the need to maximize both the access to works and the incentives to creativity in a manner that does not compromise on either. The reason for this is that the NFT creates a parallel market to the one that the works are shared in. If this parallel market entails exclusive rights for authors to mint NFTs, it can boost the incentive to create in a way that was not available before for digital art. At the same time, a digital work that is tokenized does not stop being accessible online to the same degree it was before the minting took place. Anyone who wishes to access any copyrighted digital artwork would be able to do so, subject to any preexisting restrictions on access, like technological protection measures and copyright law, to the extent those restrictions are enforced. In fact, access may even be enhanced because copyright owners would have less of an incentive to enforce their rights online if they can profit from a parallel, well-functioning NFT market.

To show how this "win-win" situation is made possible on the blockchain, let us first explain how NFTs can boost the incentive to create by allowing the concepts of scarcity and authenticity to migrate online. Then, we will show how the incentive to create is enhanced in this context without restricting the access to the underlying artwork and perhaps even broadening it. Most importantly, we explain how these dual

44. *See supra* note 10 and accompanying text; *see also* Glynn S. Lunney, Jr., *Reexamining Copyright's Incentives-Access Paradigm*, 49 VAND. L. REV. 483, 499-554 (1996) (coining the term "the incentives-access paradigm" and exploring the paradigm's premises); Landes & Posner, *supra* note 3, at 326, 341 (describing the access versus incentives tradeoff); Oren Bracha & Talha Syed, *Beyond the Incentive-Access Paradigm? Product Differentiation & Copyright Revisited*, 92 TEX. L. REV. 1841, 1842-44 (2014).

45. *See, e.g.*, Gideon Parchomovsky & Peter Siegelman, *Towards an Integrated Theory of Intellectual Property*, 88 VA. L. REV. 1455, 1458-59 (2002) (discussing the tradeoff between ex ante and ex post perspectives underlying patent and copyright law).

benefits and the cracking of the incentive-access paradigm can only be achieved if authors have an exclusive right to mint NFTs of their works.

We begin by examining the incentives side of the equilibrium. As previously noted, copyright law plays a vital role in promoting creativity by generating artificial scarcity. But this strategy has become futile in the digital world. The Internet has enabled mass duplication and dissemination of digital works without permission or consideration on a scale never before imaginable. After all, why would someone pay anything for something they can copy for free? Notably, digital copies are identical, perfect copies of the original, to the bit level.[46] It is not only impossible to distinguish between the digital copies and the original work, but there is *in fact* no distinction between the two, besides the location of the files.

The digital revolution fundamentally challenged the copyright landscape. At first, copyright law stood weaponless against the unprecedented level of piracy. While the legal rules remained in place, and even expanded, they were unable to effectuate scarcity anymore. In a state where pirated copies of works are disseminated freely, where one cannot distinguish between original and nonoriginal copies, and where enforcement is cost-prohibitive, copyright can no longer generate scarcity and further the financial incentives of authors. In the visual arts world, this problem is particularly acute with respect to digital-only works, considering that there is no physical original in which to vest the exclusive economic value of scarcity.

Of course, one can argue that even in the face of online piracy, a vast number of digital works of authorship are created daily. Yet it is hard to determine whether the current incentives to artists match the socially optimal level. For purposes of this Article's analysis, we assume that copyright is still warranted to spur creativity.

Throughout the years, laws, enforcement measures, and novel business models have endeavored to tackle the copyright crisis in the digital age but generally proved unable to reinstate scarcity in the Internet's free economy.[47] NFTs may pave a way forward in connection with digital-only artworks. The NFT is an object separate from the work, and due to the characteristics of blockchains, it is scarce: NFTs cannot be duplicated and only one person can own them.[48] Unlike the

46. *See* Anil Dash, *NFTs Weren't Supposed to End Like This*, ATLANTIC (Apr. 2, 2021), https://www.theatlantic.com/ideas/archive/2021/04/nfts-werent-supposed-end-like/618488/ [https://perma.cc/ND5B-S6M8] ("By default, copies of a digital image or video are perfect replicas—indistinguishable from the original down to its bits and bytes. Being able to separate an artist's initial creation from mere copies confers power . . . .").

47. *See generally* Lital Helman, *Fair Trade Copyright*, 36 COLUM. J.L. & ARTS 157 (2013).

48. *See* Murray, *supra* note 7, at 369-70, 382-84; Catanzaro, *supra* note 7, at 2-3; Guadamuz, *supra* note 7, at 1371.

Internet's modus operandi, the NFT must leave the seller's wallet in order to move into the buyer's. In essence, owning an NFT is like owning a physical asset. Ultimately, the NFT injects scarcity back into the market of creative works by itself becoming an object for the transaction, regardless of how many copies of the associated work exist out there. In a sense, NFTs, by creating scarcity, emulate the physical art market, and by doing so, they provide a way for authors to monetize their works in the digital environment and boost their incentives to create.

Not only are NFTs able to reinstate scarcity online, but they may also be able to recover authenticity. Authenticity is a key concept in traditional markets for creative works, particularly for visual art. Both collectors and investors care very much about whether works are original or reproductions and are willing to pay much higher prices for the former. Art markets have developed various means to verify authenticity, including expert analyses, provenance research, and scientific testing. Yet the power of the Internet to create perfectly identical files meant that authenticity has become a meaningless concept online. If all files are precisely the same, what does it even mean that one file is "original" or "authentic"? The concern under the utilitarian theory, of course, is that without authenticity, art markets cannot migrate online and the incentive to create would be stifled. NFTs may be the vehicle to import the authenticity concept online. NFTs generate authenticity by enabling the author to designate one file—the one that they point to—as original, even while copies of the file continue to be copied. In addition to visual arts, where authenticity has traditionally featured a key concept, NFTs can introduce authenticity into markets where authenticity has not been as pronounced, such as music and literature. This new feature of such assets can create new market opportunities, thus boosting the incentive to create these types of works too.

Another way to bolster artists' incentives to create through NFTs concerns resale royalties. In various jurisdictions, mostly in Europe, artists are entitled to royalties on resales of their works. This right, which originated in France in 1920, is titled *droit de suite*.[49] *Droit de suite* provides artists with ongoing income from their work, rather than proceeds from the initial sale alone. *Droit de suite* also enables artists to benefit from increases in the value of their work.[50] In the United States, only California passed legislation to this effect. The California Resale Royalty Act (CRRA) of 1976 allowed visual artists to collect a 5% royalty on resales of their art under certain circumstances.[51] Attempts to secure *droit de suite* on a federal level have

49. M. Elizabeth Petty, *Rauschenberg, Royalties, and Artists' Rights: Potential* Droit de Suite *Legislation in the United States*, 22 WM. & MARY BILL RTS. J. 977, 980 (2014).

50. *Id.*

51. CAL. CIV. CODE § 986 (West 1976).

failed.[52] In 2018, the Ninth Circuit ruled that the CRRA was preempted by the 1976 Copyright Act.[53] The reasoning of the court was based primarily on the first sale doctrine, which allows the owner of a lawful copy of a copyrighted work to sell or dispose of that copy without the permission of the copyright owner.[54] As the CRRA regulated the resale of copyrighted works, it was found to interfere with the first sale doctrine.

Yet the first sale doctrine imposes no limits on contracts that include resale royalty-type provisions, although such provisions may be difficult to enforce.[55] NFTs provide an enforceable way to secure resale royalties by encoding a resale royalty into smart contracts.[56] The use of smart contracts enables effortless enforcement of this new resale possibility by automatically delivering the specified percentage of the resale price to the artist's digital wallet upon each subsequent sale, rather than relying on individual purchaser compliance.[57] This feature of the NFT marketplace has the potential to significantly increase the financial benefits for artists, especially in cases where their works appreciate in value over time.

Notably, certain critiques that have been directed over the years at a *droit de suite* regime are largely inapplicable in the context of NFTs. One prominent critique has been that a *droit de suite* regime would not necessarily benefit artists in the long run. This is because such a regime is likely to decrease the price buyers are willing to pay for artworks and may disincentivize collectors and dealers to invest in emerging artists, knowing that they will not be able to fully capitalize on the entire appreciation of value of the artists' works.[58] In the NFT space,

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52. Petty, *supra* note 49, at 980-81.

53. Close v. Sotheby's, Inc., 894 F.3d 1061, 1072 (9th Cir. 2018).

54. The first sale doctrine is codified in 17 U.S.C. § 109(a).

55. While a contractual resale royalty provision may be perceived as conflicting with copyright law's first sale doctrine, the vast majority of courts have held that contracts are not preempted by copyright law because they create personal rights and not property rights. *See, e.g.*, ProCD, Inc. v. Zeidenberg, 86 F.3d 1447, 1454 (7th Cir. 1996); *see also* Guy A. Rub, *Against Copyright Customization*, 107 IOWA L. REV. 677, 739 (2022) (arguing that contracts should typically not be preempted by copyright).

56. *See* Megan E. Noh, Sarah C. Odenkirk & Yayoi Shionoiri, *GM! Time to Wake Up and Address Copyright and Other Legal Issues Impacting Visual Art NFTs*, 45 COLUM. J.L. & ARTS 315, 328 (2022) ("[W]hen NFTs exploded in the mainstream art world early in 2021, the effort to secure resale royalties for artists dovetailed with technological innovation in a revolutionary manner.").

57. *See, e.g.*, Pierluigi Cuccuru, *Beyond Bitcoin: An Early Overview on Smart Contracts*, 25 INT'L J.L. & INFO. TECH. 179, 194-95 (2017) (discussing smart contracts).

58. *See, e.g.*, Petty, *supra* note 49, at 1007. Moreover, some scholars have pointed out that a statutory scheme of resale royalties would also have a redistributive effect, by lowering initial sale compensation for all while benefitting only a few successful ones. *See* Guy A. Rub, *The Unconvincing Case for Resale Royalties*, 124 YALE L.J. F. 1, 6 (2014); Christopher Sprigman & Guy A. Rub, *Resale Royalties Would Hurt Emerging Artists*, ARTSY (Aug. 8, 2018, 5:00 PM), https://www.artsy.net/article/artsy-editorial-resale-royalties-hurt-emerging-artists [https://perma.cc/D5BB-TRJ6].

this consideration loses much of its force because collectors' investments are not the only game in town.[59] In addition, unlike the proposition to set a mandatory resale royalties regime that cannot be contracted around, in the NFT space, artists can assess whether a resale royalties feature hurts or helps them and decide whether to demand or waive resale royalties in connection with the token that they offer for sale. Another critique of resale royalties revolves around privacy concerns that stem from the need to disclose the identity of buyers.[60] In the NFT sphere, however, this concern is inapplicable as transactions are anonymous.

The analysis up to this point has demonstrated the potential new avenues that NFT markets provide for artists to monetize digital art. This can presumably increase incentives to create new works of art, even though one cannot expect a linear cause and effect connection between the scope of copyright protection and the level of incentives provided by the system.[61] Among other things, the level of incentives would ultimately depend on the continuous evolution of the technology and its diffusion in the marketplace, the legal and regulatory landscape surrounding NFTs, and broader market forces that shape the demand for digital art.

The important point is that the dual promises of NFTs—reinstating scarcity and reviving authenticity—can only be realized if authors are the only ones allowed to mint their works. The newly emerging authenticity concept enabled by NFTs relies on authors to designate a copy of their works as original among infinite identical copies. Scarcity would also lose its grip if it were not enforceable, and third parties remain free to mint NFTs alongside the author.[62]

Indeed, theoretically, instead of exclusive minting rights, the law could merely require notifying potential buyers of the source of the NFT. Doing this would presumably lead to two (or more) parallel markets for NFTs, where NFTs created by the authors would be worth more than NFTs created by non-authors. Yet, such a solution is costlier than the one we propose, if at all feasible. The main challenge has to do with the fact that anonymity is built into NFT transactions and is a fundamental feature of the blockchain network. Blockchain players regularly use pseudonymous or anonymous addresses to enhance privacy and security, and their real identities are often unknowable

59. As further explored below, with NFTs, artists have the ability to sell their works directly to buyers without relying on intermediaries such as galleries or auction houses. This allows emerging artists to generate revenue from their works. *See infra* Section II.A.3.

60. *See* Petty, *supra* note 49, at 989.

61. *See* Michal Shur-Ofry, *IP and the Lens of Complexity*, 54 IDEA 55, 96 (2013) ("The expectations that each increase in the scope of IP will lead to a proportionate increase in the level of innovation; that each limitation of that scope will result in a corresponding decrease in innovation; or that we can promote external socially desired values simply by limiting or calibrating the scope of intellectual property protection—are unrealistic.").

62. *See* Guadamuz, *supra* note 7, at 1383-84.

and untraceable. Compelling disclosure of a minter's identity does not seem to be viable within such an environment. There is also a risk of misrepresentation, and reports have been made of the use of practices like "sleepminting," where a third party mints a work without authorization while making it appear as if it came from the author.[63] Under conditions of anonymity, enforcement is challenging, and buyers, aware of the challenge, may be unable to trust the information provided. The lack of trust will hamper the smooth furthering of the market. Without exclusive minting rights to authors, anonymity would frustrate the development of a cheaper, parallel market for unauthentic works, even with rules that compel disclosure of the minter's identity.

Alternatively, under an exclusive minting rights regime, the underlying reputation market can work to facilitate transactions by associating the reputation of the artist to the minter at no cost, even if the identity of the buyer (and secondary seller) of the NFT remains anonymous. To be sure, anonymity does not in any way undermine authenticity and scarcity. NFTs derive their scarcity from the underlying blockchain technology, not from the identities of the individuals involved. The fact that transactions can be conducted anonymously does not change the limited supply and uniqueness of the NFT itself. What is more, although blockchain transactions can be anonymous, the underlying technology itself is transparent and publicly accessible. This transparency enables anyone to verify the authenticity and provenance of an NFT, regardless of the anonymity of the parties involved.

And there is more to be said in favor of exclusive minting rights. It is well established that a vital role of property rights lies in facilitating a market around the underlying asset while reducing transaction costs that are associated with the needs of buyers to acquire information about the transaction and the parties involved.[64] Indeed, the bestowal of property rights allows the owner to evaluate it, license it, use it as

63. *Id.* (discussing "sleepminting").

64. There is vast literature on assigning broad exclusive rights to intellectual property owners while relying on efficient bargaining to take place. Famously, Edmund Kitch has theorized that in patent law, allocating broad rights to early-stage innovators will facilitate efficient market transactions. *See* Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 276 (1977); *see also* John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439, 443-44 (2004) (arguing that the patent system's prospect features maximize the social benefits from the patent monopoly). Other scholars have criticized this theory as well as the general application of Coasean theory of efficient bargaining to the context of innovation. *See, e.g.*, Lemley, *supra* note 3, at 1045-46 (arguing against the theory's assumption "that information is perfect, all parties are rational, and licensing is costless"); Michael W. Carroll, *One Size Does Not Fit All: A Framework for Tailoring Intellectual Property Rights*, 70 OHIO ST. L.J. 1361, 1393 (2009) ("Most commentators agree that difficulties in valuing patents and copyrights raise transaction costs to the point that allocative efficiency will depend upon the subject matter, scope and duration of intellectual property entitlements."); Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 275 (2007) ("Search, identification, and transaction costs are much greater with IP than they are with land or goods.").

collateral, sell it, and conduct various other transactions with the asset. This rationale is enhanced in the context of blockchains and NFTs because of the anonymity feature discussed above. This proclaimed benefit of property rules also seems to be particularly important in the NFT market, in light of the high degree of certainty that the market for NFTs requires for its basic functioning as to the authenticity of the token and its ownership status, for which certainty can only be secured if the copyright owner is the only one permitted to mint NFTs for their work. Uncertainty as to the legality of unauthorized minting would weaken buyers' confidence, reduce prices, and eventually harm the NFT market.

One question that an exclusive minting rights regime raises regards cases where the value in the NFT stems from the reputation of the person who mints the NFT rather than the person who created the underlying work. Imagine, for example, Elon Musk minting an NFT of a photo of the first Tesla, which he did not take himself. The value of this NFT would clearly derive primarily from the reputation of Elon Musk rather than from the inherent qualities of the photo or the identity of the person who took it.

Despite the fact that in such cases much of the value of such an NFT lies with the NFT minter, we believe that a clear rule that assigns exclusive minting rights to the creator of the underlying work would promote certainty and enable a Coasean bargain between the author and value-adding third parties. Of course, copyright doctrines, in particular fair use, remain available to tackle potential market failures, such as holdup problems. Creating a clear rule that the exclusive minting right belongs to the author (the photographer, in the example above) would allow this efficient transaction, which maximizes the value of the NFT, to take place.

Altogether, any rule that does not give the copyright owner exclusive rights to mint NFTs could negatively impact the NFT market by enabling the creation of multiple NFTs of the same work being minted by different individuals or entities. This could result in a dilution of value for each NFT and hinder the potential of the NFT market to become a meaningful platform that promotes the art market.

To be sure, it is possible that the artist herself would create multiple tokens for a single piece of art—in other words, creators can divide their work into multiple editions during minting. The underlying work would visually be the same in all the different editions, but each NFT would have unique edition numbers or tokenIDs. Some have commented that this turns the scarcity of NFTs into an "illusory scarcity."[65] This possibility, however, does not seem to circumvent the

65. *See* Guadamuz, *supra* note 7, at 1384 ("While the idea behind the NFT is one of scarcity, it is only an illusory scarcity: nothing stops the creator of a digital asset that is

potential of NFTs to serve their beneficial role the same way unauthorized minting does. As it is the artist herself who makes the decision to sell multiple tokens in this scenario, then as long as potential buyers are not deceived to think they are buying the sole token representing the work, there is nothing illusory about the process. And while a supply of multiple tokens for the same work undoubtedly results in less scarcity than an offering of a single token, scarcity is not a binary concept, and the lower the number of tokens representing the same work, the higher the degree of scarcity. This is akin to the role of signed and numbered multiples in traditional art markets, where a unique original may have a higher value than a signed lithograph, but the lithograph still is worth more than unsigned, unnumbered multiples, such as posters.

After elaborating on the potential benefits of exclusive minting rights, consider now the costs side of the incentive-access paradigm, namely the concern that the increased incentives exclusivity may bring about will come at a cost to the public. While any limitations on the use of works necessarily restricts some freedoms of others, exclusive minting rights, in fact, do not create additional access barriers to the creative works themselves, which is generally the biggest concern arising out of copyright expansion. The reason for that, as noted above, has to do with the fact that NFT transactions occur on a parallel platform to the one that the works are shared in. A digital work that is tokenized can continue being accessible online, to the same extent it has been before, without affecting the value of the NFT. Once again, this is strikingly similar to the traditional art market, where the proliferation of unsigned, unnumbered multiples does not diminish the value of the unique original or of the limited edition.[66] What is more, if the NFT market proves effective in increasing the profitability of digital art, it could actually reduce the motivation of authors and other market players to invest in tools that limit access to works on the Internet, such as digital rights management (DRM), and enforcement mechanisms—which could come at a significant cost and are only

turned into an NFT to create more copies of the work and sell these 'unique' versions to the highest bidder. True, this would in principle dilute the value of the NFT, but the market is so full of different platforms that it may be possible to post different tokens of the same work in various platforms. There is nothing in the technical infrastructure of the Ethereum smart contract that stops the creation of more 'unique' versions of the same resource.").

66. *See, e.g.*, Françoise Benhamou & Victor Ginsburgh, *Copies of Artworks: The Case of Paintings and Prints*, *in* 1 HANDBOOK OF THE ECONOMICS OF ART AND CULTURE 253 (Victor A. Ginsburgh & David Throsby eds., 2006) (discussing the gaps in prices of original artworks and their reproductions).

mildly helpful anyway.[67] Therefore, access to digital art may end up increasing as a result of the increased prospect for profits derived from the same work in the separate NFT market.

Ultimately, prohibiting unauthorized minting not only strengthens the ability of NFTs to offer a solution to the scarcity and authenticity problem in the markets for digital art, but also, from a broader perspective, provides a path to transcend the incentive-access paradigm, which has heretofore been taken to be an intractable tradeoff inherent to copyright policymaking. By granting exclusive minting rights to the copyright holder, the law may enable a win-win solution, where incentives to create works of digital art are increased without sacrificing access to such works. All of this is enabled by the ability to conduct transactions in NFTs independently and separately from the artworks.

This is not to say that vesting exclusive minting rights in artists should substitute for copyright in the online world. After all, there is no guarantee that NFTs would hold value for long and clearly not for all artists. Yet, the rise of NFTs can enable artists to experiment with forgoing expensive and often futile enforcement efforts for a more direct way to benefit from digital art. Thus, while we certainly do not advocate for any legal reduction of the scope of the reproduction right online, the effect of such a shift, if it occurs, would probably be more "tolerated uses," with the resulting effect of increased access to works.[68]

All in all, the utilitarian account of copyright law seems to offer strong support for banning the unauthorized minting of copyrighted artworks. The more prevalent unauthorized minting is, the lower the buyers' trust in the system. As a consequence of unauthorized minting, the value of NFTs will likely decline, and ultimately this market for digital art could lose its potential to incentivize authorship. An exclusive minting right regime, in contrast, can boost artists' incentives to create and disseminate their artwork while enabling buyers to derive more utility from the purchase.

B. Additional Considerations

In recent years, the literature has shifted from relying exclusively on general utilitarian justifications towards a more inclusive and nuanced copyright theory.[69] Scholars and policymakers have thus begun considering additional benefits that the copyright regime can generate

67. *See generally* Dan L. Burk, *Legal and Technical Standards in Digital Rights Management Technology*, 74 FORDHAM L. REV. 537 (2005) (discussing problems with DRM); Rebecca Wexler, *The Private Life of DRM: Lessons on Privacy from the Copyright Enforcement Debates*, 17 YALE J.L. & TECH. 368 (2015) (explaining why DRM should not be a model for privacy law and policy).

68. *See generally* Tim Wu, *Tolerated Use*, 31 COLUM. J.L. & ARTS 617 (2008).

69. *See, e.g.*, ROBERT P. MERGES, JUSTIFYING INTELLECTUAL PROPERTY (2011).

aside from an increased level of creativity that is indifferent to the identity of the artist or blind to distributive concerns. Examining the case at hand from the perspective of these complementary theoretical frameworks yields additional support to the proposition that the right to mint NFTs should be bestowed upon authors of the underlying work.

Below we discuss the matter first via the lens of two other prime justifications that undergird copyright law besides the utilitarian theory, namely the labor theory and the personality theory, and show that they provide strong support for granting authors exclusive minting rights. Next, we show that awarding exclusive minting rights to authors can further distributive justice and cultural diversity of authorship.

1. Labor Theory

One of the principal theories used in support of property rights is the labor theory, based on the work of John Locke. Locke argued that every person has a right to the fruits of her labor.[70] This is a theory of natural law which views property rights as preexisting in the state of nature.[71] The starting point for Locke's theory is that God gave the world to men in common;[72] "yet every Man has a *Property* [right] in his own *Person*,"[73] and from such right follows his right to "[t]he *Labour* of his Body, and the *Work* of his Hands."[74] Therefore, whatever a person has removed out of its natural state, and mixed her labor therewith, belongs to her. There are two main limitations, under the labor theory, to the scope of property rights that a person may acquire in the fruits of her labor[75]: (1) "there is enough, and as good left in common for

70. *See* JOHN LOCKE, TWO TREATISES OF GOVERNMENT 290-91 (Peter Laslett ed., Cambridge Univ. Press 1988) (1690).

71. *See* JEREMY WALDRON, THE RIGHT TO PRIVATE PROPERTY 19 (1988); Daphna Lewinsohn-Zamir, *Compensation for Injuries to Land Caused by Planning Authorities: Towards a Comprehensive Theory*, 46 U. TORONTO L.J. 47, 50 (1996).

72. *See* LOCKE, *supra* note 70, at 286.

73. *Id.* at 287.

74. *Id.* at 287-88.

75. In addition to these limitations, it can be argued that property acquisition should be limited by the general principle of natural law, pursuant to which one should not cause damage to another, other than in certain instances of extreme necessity. *See* LOCKE, *supra* note 70, at 271 ("[N]o one ought to harm another in his Life, Health, Liberty, or Possessions."). However, this principle may not be necessary as a separate limitation on the ability to acquire property, as it seems that Locke took it into account while designing the specific rules governing the acquisition of property. First, the principal rule itself, assigning property rights to the laborer, can be justified by the no-harm principle, assuming that taking the fruits of her labor away would cause the laborer harm. *See* Wendy J. Gordon, *A Property Right in Self-Expression: Equality and Individualism in the Natural Law of Intellectual Property*, 102 YALE L.J. 1533, 1544-45 (1993); Benjamin G. Damstedt, Note, *Limiting Locke: A Natural Law Justification for the Fair Use Doctrine*, 112 YALE L.J. 1179, 1185-86 (2003). Second, in order to ensure that no harm is caused to others as a result of the grant of a property right to the laborer, Locke set the two specific limitations discussed in the text. *See* Gordon, *supra*, at 1562-63; Damstedt, *supra*, at 1185.

others";[76] and (2) the laborer does not waste resources by taking more than she needs for her own use, including use by means of exchange with others.[77] The mere argument that a person owns a right to her own body, hence, to the labor of her body, and therefore to anything that results from mixing her labor with common resources may be sufficient to justify property rights in the fruits of one's labor. Yet, scholars engaging with the labor theory as a justification for property rights often resort to additional reasoning, grounded in Locke's writings or elsewhere.[78] One such common explanation for recognizing property rights in the fruits of one's labor is that when labor results in something valuable for society, then the laborer is morally entitled to a just reward in consideration for such value.[79] The labor theory can also be tied to general principles of unjust enrichment, which are based on notions of corrective justice, as absent property rights for the fruits of one's labor, others who exploit such fruits may end up unjustly enriching at the laborer's expense.[80]

While the labor theory has been criticized on various grounds,[81] it has become one of the main theories for justifying rights in private property.[82] Even though the theory originally focused on property rights in physical assets,[83] it has also been used for the justification and analysis of intellectual property rights, including copyright.[84]

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76. *See* LOCKE, *supra* note 70, at 288.

77. *See id.* at 290, 295, 300.

78. *See, e.g.*, Wendy Lim, *Towards Developing a Natural Law Jurisprudence in the U.S. Patent System*, 19 SANTA CLARA COMPUT. & HIGH TECH. L.J. 561, 579 (2003).

79. *See, e.g.*, Lawrence C. Becker, *Deserving to Own Intellectual Property*, 68 CHI.-KENT L. REV. 609, 624 (1993); Justin Hughes, *The Philosophy of Intellectual Property*, 77 GEO. L.J. 287, 305 (1988). For other justifications for property rights in the fruits of one's labor, see Ofer Tur-Sinai, *Beyond Incentives: Expanding the Theoretical Framework for Patent Law Analysis*, 45 AKRON L. REV. 243, 258-59 (2012).

80. *See* LOCKE, *supra* note 70, at 297 ("He that had as good left for his Improvement, as was already taken up, needed not complain, ought not to meddle with what was already improved by another's Labour: If he did, 'tis plain he desired the benefit of another's Pains, which he had no right to . . . .").

81. *See, e.g.*, Tur-Sinai, *supra* note 79, at 259-60. For one critical argument, see *infra* note 88 and accompanying text.

82. *See, e.g.*, J.W. HARRIS, PROPERTY AND JUSTICE 188-89 (1996); STEPHEN R. MUNZER, A THEORY OF PROPERTY 254-60 (1990); WALDRON, *supra* note 71, at 137-252; *see also* Shelly Kreiczer-Levy, *Reclaiming Feudalism for the Technological Era*, 41 CARDOZO ARTS & ENT. L.J. 183, 216-18 (2023) (discussing Lockean justifications for data portability).

83. For an argument that a more thorough examination of Locke's writings reveals that he actually had a solid point of view as to rights in intangibles as well, see Lior Zemer, *The Making of a New Copyright Lockean*, 29 HARV. J.L. & PUB. POL'Y 891 (2006).

84. *See, e.g.*, Becker, *supra* note 79; Hughes, *supra* note 79; Damstedt, *supra* note 75; Gordon, *supra* note 75; Zemer, *supra* note 83; Adam D. Moore, *A Lockean Theory of Intellectual Property*, 21 HAMLINE L. REV. 65, 80 (1997); Stephen M. McJohn, *The Paradoxes of Free Software*, 9 GEO. MASON L. REV. 25, 44 (2000); Caroline Nguyen, *Toward an Incentivized but Just Intellectual Property Practice: The Compensated IP Proposal*, 14 CORNELL J.L. & PUB. POL'Y 113, 119-26 (2004); Molly A. Holman & Stephen R. Munzer, *Intellectual Property Rights in Genes and Gene Fragments: A Registration Solution for Expressed Sequence Tags*, 85 IOWA L. REV. 735, 832-35 (2000); Tur-Sinai, *supra* note 79.

Applying the theory to intangibles is quite obvious. When a person creates a work of authorship or develops a technological invention, she invests her labor in the process, and therefore—according to the labor theory—is entitled to rights over the product resulting from such process, provided only that the conditions for the acquisition of property set forth by Locke are met: enough is left for others and there is no waste of resources.[85]

Analyzing the situation of unauthorized minting under the labor theory bolsters the argument for locating exclusive control of minting NFTs of works at the hands of their authors. The author, who has put in the labor to create the artwork, is the one who deserves to enjoy the fruits of such labor, including fruits "hanging" in NFT markets. As noted above, due to the difficulty of profiting from selling or licensing digital art in other means, NFTs may become an important source of revenue for digital artists.[86] Exclusive minting rights to authors also prevents free riders from gaining unjust enrichment at the authors' expense.[87] Notably, by giving control to artists over minting their own works, we do not narrow the opportunities of others to labor, contrary to the first Lockean proviso. In fact, they can even labor in NFT markets, as long as they tokenize their own work or negotiate a license to tokenize someone else's work.

One potential counterargument to the argument presented above could be that aside from an artist's labor invested in the creation of an artwork, there are other factors, including the ideas and inspiration behind the work, which contribute to its value. Indeed, a general argument often made against the labor theory is that it is predicated on an unrealistic assumption that labor can be attributed exclusively to a single individual. As work in modern day, so goes the argument, is typically done in teams comprised of numerous individuals and in an environment that provides the laborer with the necessary tools and opportunity to work, granting exclusive rights in an asset to an individual cannot be justified based on the argument that it is the product of her labor.[88] Yet even if we acknowledge that other factors contribute to the value of an artwork, it is fundamentally the artist's labor that is the most central and significant element in its creation.

85. For a discussion of these conditions in connection with intellectual property protection, see generally Hughes, *supra* note 79, at 315-29; Nguyen, *supra* note 84, at 119-25; Tur-Sinai, *supra* note 79, at 265-72.

86. *See* discussion *supra* Section II.A.

87. *See supra* note 80 and accompanying text for the relevance of unjust enrichment considerations to the labor theory.

88. *See* Morris R. Cohen, *Property and Sovereignty*, 13 CORNELL L.Q. 8, 16 (1927) ("[E]conomic goods are never the result of any one man's unaided labor . . . .").

2. Personality Theory

Another theory that is often used to justify property rights, including copyright, is the personality theory, which is often ascribed to the philosophical writings of Hegel.[89] According to the personality theory, property is necessary as a means for developing and realizing one's personality. Pursuant to Hegel, an individual needs control over external objects in order to exercise his or her will and achieve self-identity.[90] Property rights provide the freedom of action and sense of security needed for a person to identify herself through her relationship with assets.[91] This theory was refined by Professor Radin in the twentieth century.[92]

Professor Radin has gone a step further in her attempt to use the personality theory as the basis for detailed recommendations with respect to the appropriate design of property protection. According to Radin, a distinction should be made between various types of objects based on how closely they are bound up with personhood. At one end of the spectrum, there are certain objects that are often part of the way human beings constitute themselves as continuing personal entities in the world ("personal property")—a wedding ring, a portrait, an heirloom, or a house. At the other end of the spectrum, there are objects held for purely instrumental reasons ("fungible property")—money, a share certificate, an automobile in the hands of a dealer, or an undeveloped tract of land in the hands of a contractor.[93] An indicator of an object being "personal" is that its loss cannot be compensated through payment or replacement with another object of a similar market value due to its unique value to its owner, whereas a "fungible" object, by definition, is perfectly replaceable with other goods of equal market

89. *See* G.W.F. HEGEL, PHILOSOPHY OF RIGHT (S.W. Dyde trans., 2001). A foundation for the personality theory of copyright can also be found in Kant's philosophical writings. Kant's essential argument in this context was that unauthorized copying may sometimes interfere with an author's personal interests. IMMANUEL KANT, *On the Wrongfulness of Unauthorized Publication of Books*, *in* PRACTICAL PHILOSOPHY 23, 31-35 (Mary J. Gregor ed. & trans., 1996); *see also* Christopher S. Yoo, *Rethinking Copyright and Personhood*, 2019 U. ILL. L. REV. 1039 (2019).

90. *See* HEGEL, *supra* note 89, at 50-53.

91. *Id.*; *see also* Margaret Jane Radin, *Property and Personhood*, 34 STAN. L. REV. 957, 957, 972-73 (1982) [hereinafter Radin, *Personhood*]; Lim, *supra* note 78, at 579; Hughes, *supra* note 79, at 330; Brian M. Hoffstadt, *Dispossession, Intellectual Property, and the Sin of Theoretical Homogeneity*, 80 S. CAL. L. REV. 909, 934-35, 948 (2007).

92. *See* Margaret Jane Radin, *Market-Inalienability*, 100 HARV. L. REV. 1849, 1893 (1987). For a recent criticism of Radin's version of the personality theory, see Jeanne L. Schroeder, *Unnatural Rights: Hegel and Intellectual Property*, 60 U. MIAMI L. REV. 453 (2006) (claiming that Radin's version is too remote from the original Hegelian theory to be considered derived from it). For Radin's treatment of the differences between her thesis and Hegel's theory, see Radin, *Personhood*, *supra* note 91, at 977.

93. *See* Radin, *Personhood*, *supra* note 91, at 959-60.

value.[94] Radin thus does not focus on the development process of an object, but rather on the relationship formed between the object and whoever holds it; accordingly, the same object can be considered personal or fungible, depending on the identity of its current holder.[95] On a normative level, Radin's basic argument is that legal rules should be designed with sensitivity to this distinction. In essence, the more a relationship to an object is located towards the personal end of the continuum, the more the entitlement should be protected.[96] Radin suggests that, at least in certain cases, interests in personal property should be protected against invasion by the government and against cancellation by conflicting fungible property claims of other people by property rules, as no compensation for their taking could be just.[97]

Radin's personality theory has been criticized from various angles. The theory has nevertheless been used often in discussions of intellectual property law, especially copyright law.[98] The common position in the literature is that intellectual products are closer to the personal end of Radin's continuum of objects. Such assets are not only held by an individual but are also her creation, thus reflecting her personality, and the personal bond between the individual and such assets is particularly strong.[99] Accordingly, various scholars used the personality theory in support of arguments calling for the strengthening of authors' rights, and in particular, their moral rights, including the right of attribution and the right of integrity.[100] It should be noted that this

94. For a description of Radin's insight with respect to the distinction between personal objects and fungible objects as part of a broader phenomenon—the existence of a gap between the price at which the holder of an object is willing to sell it and the price at which buyers are willing to pay for the same object in the market, see Abraham Bell & Gideon Parchomovsky, *A Theory of Property*, 90 CORNELL L. REV. 531, 568 (2005). The gap might be due to sentimental causes as Radin points out, but it might also be caused by a variety of other reasons, some rational and others affected by cognitive biases, such as the "endowment effect." *See id.*

95. *See* Radin, *Personhood*, *supra* note 91, at 987; *see also* Steven Cherensky, *A Penny for Their Thoughts: Employee-Inventors, Preinvention Assignment Agreements, Property, and Personhood*, 81 CALIF. L. REV. 595, 644-45 (1993).

96. *See* Radin, *Personhood*, *supra* note 91, at 986.

97. *Id.* at 988, 1005, 1014-15.

98. *See generally* Becker, *supra* note 79, at 610; Amie N. Broder, *Comparing Apples to APPLs: Importing the Doctrine of Adverse Possession in Real Property to Patent Law*, 2 N.Y.U. J.L. & LIBERTY 557, 573 (2007); Cherensky, *supra* note 95, at 644-45; Kurt L. Glitzenstein, *A Normative and Positive Analysis of the Scope of the Doctrine of Equivalents*, 7 HARV. J.L. & TECH. 281, 319-22 (1994); Hoffstadt, *supra* note 91, at 935; Hughes, *supra* note 79, at 330; Justin Hughes, *The Personality Interest of Artists and Inventors in Intellectual Property*, 16 CARDOZO ARTS & ENT. L.J. 81, 82 (1998); Lim, *supra* note 78, at 579; McJohn, *supra* note 84, at 45; Nguyen, *supra* note 84, at 126-30; David W. Opderbeck, *A Virtue-Centered Approach to the Biotechnology Commons (or, the Virtuous Penguin)*, 59 ME. L. REV. 315, 319 (2007).

99. *See* Hughes, *supra* note 79, at 330, 365; Becker, *supra* note 79, at 610; Hoffstadt, *supra* note 91, at 935; McJohn, *supra* note 84, at 45; Opderbeck, *supra* note 98, at 319.

100. *See, e.g.*, Hughes, *supra* note 98, at 165 (noting the right of attribution); Edward J. Damich, *The Right of Personality: A Common-Law Basis for the Protection of the Moral*

approach, according to which a personhood interest—justifying an increased level of protection—can result from the fact that an object was created by someone whose personality is embedded in it,[101] deviates from Radin's version of the personality theory, which focuses on the attachment created between an object and its holder while attributing no significance to the development process of the object.[102]

The application of the personality theory in the context of NFTs necessitates careful consideration. After all, as clarified earlier, an NFT is merely a link to a digital artwork. We thus do not claim that an NFT embodies an artist's personality. However, to the extent that a flourishing marketplace for NFTs representing artworks is emerging, the personality theory may strengthen the argument for exclusive minting rights for authors. Commercializing creative works, including via tokenizing them and offering the ensuing NFTs for sale, may contribute to the development of an artist's personality. By doing so, the artist reveals herself to others (if only by a pseudonym) and may acquire recognition, respect, and appreciation by others.[103]

Remarkably, there is an unobvious connection between the personality theory and the utilitarian theory discussed above. As discussed, unauthorized minting may deprive artists of the opportunity to profit off their work and discourage further creativity. But this can not only affect the availability of works in society, which is the utilitarian theory's concern, but also close a venue of expression for authors and hurt their ability to further develop their personality through creativity.[104] Further, as the artist is the one whose skills, aesthetic choices, and other aspects of personality are embedded in the work, she should have the right to determine how these personal expressions of hers are shared and distributed. This may be particularly important in this context, considering that the NFT sphere is new and evolving, and various choices are involved in the process: whether to tokenize the work at all, what smart contract to include in it, what platform to use, and many others.

Rights of Authors, 23 GA. L. REV. 1, 4 (1988) (noting the right of integrity; though not explicitly mentioning the personality theory as such, the article's thesis is grounded in the notion that artistic works reflect the creative personalities of their authors).

101. For a discussion of various personality aspects that may come into effect in the process of creating an intellectual product, see Hughes, *supra* note 98, at 82.

102. *See supra* note 95 and accompanying text. This approach is certainly remote from Hegel's original theory. *See* Schroeder, *supra* note 92, at 454 (pointing out that Hegel's theory cannot be legitimately used to justify moral rights or other increased rights with respect to intellectual property). Interestingly, the approach described in the text has early roots in the writings of Kant and Fichte, who viewed literary works, specifically, as external expressions of their authors' personalities. *See generally* PETER DRAHOS, A PHILOSOPHY OF INTELLECTUAL PROPERTY 80-81 (1996); DAVID SAUNDERS, AUTHORSHIP AND COPYRIGHT 106-15 (1992).

103. *Cf.* Hughes, *supra* note 79, at 349-51 (making a similar argument with respect to commercialization of copyrighted works in general).

104. *Cf. id.*

Relatedly, some authors may wish to resist tokenization altogether. Through the prism of the personality theory, such decisions that are made for authors by others violate their very personality. Interestingly, at least in some cases, artists whose works were minted without permission felt precisely that.[105] For all these reasons, the personality theory clearly supports the arguments in favor of granting exclusivity to the artist over tokenization of her works. This conclusion may not come as a surprise. The personality theory may well be the most expansive of all three main theories of copyright law. Yet, in the NFT context, this theory offers an even stronger argument. Among other things, the environmental effect of blockchain and the idea that everything and anything can be tokenized, monetized, and sold are two propositions that can create discomfort for authors.[106] Forcing them to participate in this market by minting NFTs of their works whether they agree or not can be found rather offensive under the personality theory.

Interestingly, this theory can have intriguing consequences in the area of NFTs, which exceed the scope of this Article. Mainly, this theory may raise doubts as to the ability of authors to untie the knot with their creative works. This theory may therefore seek to place limitations on the ability to release full control over the use of the work, on the type of smart contracts that can be written, and perhaps on other issues as well.

3. Distributive Justice and Cultural Diversity

Support for exclusive minting rights for authors stems from two additional principles: distributive justice and cultural diversity. These principles are not conceived as fundamental underpinnings of copyright, yet contemporary copyright policies endeavor to promote them both. In the NFT context, these principles can be viewed as two sides of the same coin. The idea is to allow more diverse authors in the market and more varied works of authorships. From the prism of distributive justice, this policy aim would correct historical discrimination against authors who were excluded from traditional art markets. From the perspective of cultural diversity, opening the floor to more diverse authorship would produce a kaleidoscope of authorship and enrich society with a variety of artistic expressions.

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105. *See, e.g.*, Bijan Stephen, *NFT Mania Is Here, and So Are the Scammers*, VERGE (Mar. 20, 2021, 10:00 AM), https://www.theverge.com/2021/3/20/22334527/nft-scams-artists-opensea-rarible-marble-cards-fraud-art [https://perma.cc/2BG7-BK7W] (describing some artists' responses to unauthorized minting of their artwork).

106. With respect to the environmental impact of the technology, see Peter Howson, *NFTs: Why Digital Art Has Such a Massive Carbon Footprint*, CONVERSATION (Apr. 1, 2021, 9:42 AM), https://theconversation.com/nfts-why-digital-art-has-such-a-massive-carbon-footprint-158077 [https://perma.cc/JEF4-QSET].

Exclusive minting rights can promote distributive considerations in three main ways. First, exclusive minting rights would enable a more just distribution of the value that creative works produce. Generally, distributive considerations support policies that enable authors to profit from their work because most authors do not earn a sustainable income from authorship. In fact, authorship and creativity produce much value that authors do not capture. This value is divided between users, distribution platforms, and a plethora of intermediaries that play a role in cultural industries. Exclusive minting rights would prevent additional third parties from sharing with authors in the value that their works produce by freely minting NFTs of their works.

The second, related way that NFTs promote distributive justice is that the NFT market skips over the need to sell art through traditional intermediaries: galleries and curators, record labels, film production companies, publishers, and various others. Clearly, intermediaries would still be needed to promote artists' works in order to spur demand for such works. But the need to pay for reputation-building services on an individual basis is unlike the need to earn a coveted spot through industry gatekeepers before a work is put on the market. Thus, not only would exclusive minting rights prevent new third parties from sharing in the value that creative works produce, but it also would enable authors to seize a larger chunk of sales compared with traditional markets. Sure enough, the prospect to sell without intermediaries was celebrated already with the rise of the Internet, and—to a large extent—failed.[107] NFTs may just be another unlikely hope. Yet NFTs may prove to be different. Unlike previous revolutions, which basically formed an open invitation to invent new business models, NFTs provide a specific, clear way to make profits from digital works: selling a link to them on the blockchain.

Finally, NFT markets have a potential to be more inclusive towards diverse artists. Traditional art markets have benefitted from economies of scale. A museum or a radio station could not profit from selling works that appealed to small audiences. The NFT market can allow more niche authors to find audiences, and unlike in the pre-NFT Internet, to actually sell to these audiences.

For similar reasons, exclusive minting rights for authors can advance cultural diversity. Evidently, the gatekeeping function of intermediaries has adversely affected the variety and diversity of art. The overwhelming control intermediaries have held over the funding and distribution in the creative industries created barriers to entry for artists because authors who were unable to secure recording contracts, publishing contracts, or gallery access could not effectively create and

107. *See* Helman, *supra* note 47, at 164.

disseminate art.[108] Even when the digital age reduced the costs of creation and distribution, intermediaries were much needed for the monetization of works, as the Internet made it possible to distribute works freely but not to monetize them.[109]

The pre-NFT system, where artists had few opportunities to earn money without the involvement of intermediaries, subjugates the availability of art to the business interests of intermediaries. Because intermediaries' profits stem from economies of scale, they have an incentive to produce art that fits the mainstream taste and yields maximum profits. The dominance of intermediaries in the art business thus produces a powerful incentive for artists to create works that would fit the dominant taste and appeal to gatekeepers.[110]

Placing the right to mint NFTs in the hands of authors can improve their independence and, as a result, may enhance authorship diversity. NFT technology offers a way for artists to reach diverse audiences and monetize their art without giving up their uniqueness. Granted, intermediaries in the NFT market abound.[111] But while their existence bites into the value that NFTs provide for distributive justice, it barely affects cultural diversity because most of these intermediaries do not screen for quality, genre, or taste.[112] Of course, there is no guarantee that NFTs would effectively promote diverse artists, and it would be overoptimistic to expect changes in the art market to occur overnight.[113] Among other things, NFT-selling artists may still attempt to appeal to the widest common denominator in order to increase the prospect of making profits in the NFT market. Indeed, the inclination towards a limited number of popular works and the associated "winner takes it all" dynamics are inherent phenomena of markets for creative

108. *See, e.g.*, Raymond Shih Ray Ku, *The Creative Destruction of Copyright: Napster and the New Economics of Digital Technology*, 69 U. CHI. L. REV. 263, 306 (2002); Lital Helman, *When Your Recording Agency Turns into an Agency Problem: The True Nature of the Peer-to-Peer Debate*, 50 IDEA 49, 54-56 (2009).

109. *See* Helman, *supra* note 47, at 169.

110. *See generally* NEIL WEINSTOCK NETANEL, COPYRIGHT'S PARADOX 38-41, 109, 135-40 (2008); Mark S. Nadel, *How Current Copyright Law Discourages Creative Output: The Overlooked Impact of Marketing*, 19 BERKLEY TECH. L.J. 785 (2004); Netanel, *supra* note 40, at 296.

111. Such intermediaries include, for example, NFT marketplaces and sales platforms, payment gateways (such as Ethereum wallets), storage solutions, and others.

112. *See, e.g.*, James G. Gatto, *NFT License Breakdown: Exploring Different Marketplaces and Associated License Issues*, NAT'L L. REV. (Sept. 21, 2021), https://www.natlawreview.com/article/nft-license-breakdown-exploring-different-marketplaces-and-associated-license-issues [https://perma.cc/692X-3GF7] (describing the practice of "open" NFT marketplaces, like OpenSea and Rarible, where anyone can mint and list NFTs without a traditional vetting or selection process based on artistic merit).

113. *See* Langston Thomas, *The NFT Space Needs to Do More to Uplift Black Artists*, NFT NOW (May 11, 2022), https://nftnow.com/features/the-nft-space-needs-to-do-more-to-uplift-black-artists/ [https://perma.cc/Q7RQ-DGTS] (discussing the inferior position of people of color in the NFT space and potential ways to address this phenomenon).

works regardless of the existence of gatekeepers.[114] Yet, to the extent traditional gatekeepers reinforce the push towards mass consumption of art and thus create barriers to entry for diverse types of art and artists, the decentralized (or, at least, less centralized) NFT market can contribute to the diversification of art and of artists.

III. DOCTRINAL MECHANISMS

The previous Part established that we would be better off if authors had exclusive minting rights. It explained how such a policy would boost the incentive to create while at the same time preserving access to creative works. It also showed that exclusive minting rights would align with the labor and personality theories of copyright law and encourage the participation of diverse and disadvantaged groups of authors to take a more central role in the art scene.

The question then becomes what legal vehicles exist to achieve this policy. A number of doctrines may be helpful in this regard. First, copyright law, which features the key tool to define exclusive rights in creative works, is supposedly the best vehicle to secure exclusive minting rights. Yet, as we show below, copyright, at least in the present, would not come to the rescue in all cases. The second set of tools we examine is authors' moral rights. But as our analysis below shows, the limited protection for moral rights under U.S. law makes it difficult to rely on this area of the law as a basis for regulating the space. A third option may be to rely on state law doctrines, such as misappropriation, but these come with their own limitations. This Part concludes that a gap exists between the desired policy and the legal means to achieve it at the present. Yet, on a practical level, the combination of these potential vehicles appears to offer a toolkit that can be useful in many cases. It remains to be seen whether the availability of these tools and their utilization in real-world scenarios would generate a sufficient market incentive to avoid unauthorized minting.

A. Copyright

The most natural candidate to effectuate a policy against unauthorized minting is copyright law. Copyright law comprises the framework that sets the balance between authors' exclusive rights in their works and other interests. Copyright law confers upon authors enumerated exclusive rights. This set of rights includes the right to reproduce a work, to publicly display or perform the work, to distribute copies of

114. *See generally* Michal Shur-Ofry, *Copyright, Complexity and Cultural Diversity—A Skeptic's View*, *in* TRANSNATIONAL CULTURE IN THE INTERNET AGE (Sean A. Pager & Adam Candeub eds., 2012). In fact, in certain circumstances, gatekeepers may play a role in promoting diversity amidst such market dynamics.

the work, and to make derivative works based on the work.[115] Using one or more of the exclusive rights without the copyright holder's consent is considered infringing, provided that no relevant exception applies, while any other uses of the works are considered non-infringing.[116]

The point is that minting an NFT *per se* is not enumerated as one of the copyright holder's exclusive rights. What is more, as we show below, NFT minting does not interfere with the exclusive rights that the law *does* grant to authors. Harnessing copyright law to construct exclusive minting rights would entail either a very broad interpretation of the existing exclusive rights or explicitly adding minting rights through legislation to the copyright bundle of rights. A third option would be to attach liability to unauthorized minting based on ancillary functions of the NFT minting process rather than the act of minting itself. As we discuss below, the first option is hardly available under the accepted interpretation of the statute. The second and third options are theoretically possible, but their costs, in our opinion, far outweigh their benefits. A fourth option that may prove more promising in certain cases is to rely on secondary liability doctrines of copyright law.

We begin with the option to interpret one of copyright's existing set of exclusive rights to apply to NFT minting. As mentioned, copyright grants authors enumerated exclusive rights. The most basic right in copyright is the *reproduction right*.[117] This right means that copyright owners solely can copy (or authorize copying of) their works. Had the minting process involved copying of the underlying work, this Article could have been much shorter: minting would have triggered the reproduction right and therefore would have featured copyright infringement. But minting does not require copying. The reason is that copying the work and storing it "on-chain" is often cost-prohibitive.[118] To

115. *See* 17 U.S.C. § 106 (detailing the exclusive rights in the United States). Other countries provide authors with similar rights. *Cf.* Copyright, Designs and Patents Act 1988, c. 48, § 16 (UK) (detailing the exclusive rights in the UK); Directive 2001/29/EC, of the European Parliament and of the Council of 22 May 2001 on the Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society, 2001 O.J. (L 167) 2-4 (detailing some of the exclusive rights in the European Union).

116. In some jurisdictions, authors also enjoy moral rights, which denote rights such as the right of attribution and the right to the integrity of the work. For discussion, see *infra* Section III.B.

117. *See, e.g.*, 17 U.S.C. § 106; *see also* Mazer v. Stein, 347 U.S. 201, 218 (1954) ("[Without] copying there can be no infringement . . . .").

118. Storing the underlying work "on-chain," as part of the NFT, is technically possible. The reason works are not copied to the blockchain is the costs involved. It is simply too costly to store creative works on the blockchain, hence the use of linking. The storage of NFTs' associated works outside of the blockchain causes problems, including the risk that the host of the work would change the URL or remove it altogether, and the NFT would comprise a broken link. If this technological hurdle is overcome and underlying works would be copied to the blockchain as part of the minting process, the copyright obstacle would become material because minting would inherently consist of copying.

overcome this challenge, NFTs forgo reproduction and instead include a link to the work. The work itself resides "off-chain," elsewhere on the web. At most, the NFT would include the title of the work, the name of the author, and legal information about the copyright status of the work and other terms and conditions.[119] In fact, even this information is rarely included. Typically, NFTs contain merely the link to a digital copy of the associated work and some metadata, such as information on the creator of the NFT, the date of minting, and contractual terms that follow the NFT. Furthermore, case law requires that the subsequent copy be "substantially similar" to the original work to establish infringement.[120] Clearly, the NFT and its underlying work are not similar at all. In short, the typical case of NFT minting does not technically involve a reproduction of the underlying work, and hence, it cannot be construed to interfere with copyright owners' reproduction right.[121]

For the same reason, namely that the NFT does not embody the work itself, it is difficult to argue that minting NFTs violates other exclusive rights of copyright owners. First, NFT minting cannot be considered *making a derivative work* because an NFT is not a "work" at all, let alone a derivative work.[122] The law defines a derivative work as "a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which a work may be recast, transformed, or adapted."[123] According to a line of cases, this definition requires derivative works to incorporate or embody a portion of the material from the preexisting work itself.[124] Yet, as discussed above, the NFT does not do that.[125]

Had we wished to offer a particularly broad definition of the right to *make derivative works* in order to include NFT minting, then the only feature that the NFT derives from the original work is its hash value, which is a string of letters and numbers that is generated by applying a mathematical function to the content of the file, which has

119. *See* Guadamuz, *supra* note 7, at 1370-71.

120. *See* Rentmeester v. Nike, Inc., 883 F.3d 1111, 1117 (9th Cir. 2018) ("To infringe, the defendant must also copy enough of the plaintiff's expression . . . to render the two works 'substantially similar.' "); Blehm v. Jacobs, 702 F.3d 1193, 1202 (10th Cir. 2012); Tufenkian Exp./Imp. Ventures, Inc. v. Einstein Moomjy, Inc., 338 F.3d 127, 131 (2d Cir. 2003).

121. *See* Guadamuz, *supra* note 7, at 1370 (explaining that NFTs include a tokenID—generated by the minting process, contract address for the transaction protocol, and typically also the wallet address of the minter and a hash value).

122. For the exclusive right to make derivative works, see 17 U.S.C. § 106(2).

123. *Id.* § 101 (defining "derivative work").

124. *See, e.g.*, Lewis Galoob Toys, Inc. v. Nintendo of Am., Inc., 964 F.2d 965, 967 (9th Cir. 1992); *see also* H.R. REP. NO. 94-1476, at 62 (1976) (explaining that "the infringing work must incorporate a portion of the copyrighted work in some form").

125. *See supra* note 120 and accompanying text.

only technical functionality and means nothing to human beings. Relying on the hash value would be, well, ludicrous. Not only is the hash value total nonsense in terms of meaning, but it is also not even created by the author of the underlying work. It is a technical sequence that is automatically created when a link is formed or other operations are performed on a file. The hash value has no connection to the content of the work or to any protected feature in it and cannot even be traced to recreate the original work. We, therefore, conclude that the attempt to fit NFT minting under the wings of the *making derivative works* right is rather futile.

NFTs—and clearly the act of NFT minting—also do not *distribute* the works nor *display* them. NFTs only link to works that are distributed and displayed elsewhere.[126] U.S. copyright law regarding linking is quite clear on this point. While a debate persists whether "embedded links"—links that are embedded or included within the content—comprise public display of the underlying work,[127] it is rather settled that linking to a work, particularly a non-infringing work, does not give rise to copyright violation claims, at least as far as direct infringement goes.[128] The reason for the distinction between embedded and nonembedded links is that in the former, the linked-to work is downloaded automatically when the link is presented, which can justify the interpretation that the provider of the link displays the work. But this is not remotely the case for an NFT. In the NFT case, the link does not present the work. In fact, the link on the NFT is not even as easy to operate as a regular link and the work is not as easily extractable from the link.[129] Expanding the *display* right to apply to NFTs thus appears to be a very unsound interpretation of the statute.

It is even more obvious that minting does not violate the *distribution* right. The distribution right is defined as the right "to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending."[130] Yet, as discussed, the NFT neither creates a copy nor distributes it.[131] Rather, the NFT only transfers the data regarding the ownership of the file

126. *See* 17 U.S.C. § 106(5); Guadamuz, *supra* note 7, at 1368-70.

127. *See, e.g.*, Perfect 10, Inc. v. Amazon.com, Inc., 508 F.3d 1146, 1160-61 (9th Cir. 2007); Goldman v. Breitbart News Network, LLC, 302 F. Supp. 3d 585, 595-96 (S.D.N.Y. 2018); Nicklen v. Sinclair Broad. Grp., Inc., 551 F. Supp. 3d 188, 194-95 (S.D.N.Y. 2021).

128. *See, e.g.*, Ticketmaster Corp. v. Tickets.Com, Inc., 2000 U.S. Dist. LEXIS 12987, at *12-13 (C.D. Cal. Aug. 10, 2000).

129. *See* Guadamuz, *supra* note 7, at 1381 ("In order to extract the link, one has to have some knowledge of the technology, and sometimes one may require knowing both the unique tokenID and the smart contract address.").

130. 17 U.S.C. § 106(3).

131. "Copies" are defined in 17 U.S.C. § 101 as "material objects . . . in which a work is fixed by any method . . . and from which the work can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device."

(like the way that ownership in real estate occurs through transfer of a deed without the property being moved, let alone "copied" or "distributed").[132]

In short, it appears hardly possible to interpret copyright law broadly enough to "catch" unauthorized NFT minting. We should also bear in mind that expanding copyrights through interpretation in response to new technologies may have undesired consequences. Among other things, technology changes rapidly and can maneuver itself out of the expansive interpretation rather easily. Yet, these maneuvers often generate waste and can also stifle innovation and distort incentives of market players.[133] At the same time, expansive interpretation of the exclusive rights can unintentionally apply to unintended areas that were overlooked during the NFT hunt. This effect can harm the public domain and distort the balance that copyright law strives to achieve.

Let us now discuss the option to rely on ancillary functions to "get" unauthorized minting of NFTs. Indeed, while at its core, NFT minting may be beyond the confines of copyright law, related NFT practices typically require reproduction, display, and distribution of the underlying work. Prior to minting an NFT, a copy of the work must be stored digitally. While it is possible to link to the work in its current location, it is rather common for NFT sellers to copy the underlying work to a different location on the web in order to better control the URL. And copying is an exclusive right of copyright holders. Similarly, the promotion and sale of the NFT typically involve other infringements, such as creating additional copies, public display, or public performance of the work. Because copyright is engaged throughout the NFT marketing process, it may be possible to rely on ancillary functions of the NFT process that *do* violate copyright law in order to effectively save minting rights to authors.

Yet all these functions are not essential to the minting process. While such actions may practically help NFT minting, the core functionality of minting involves simply creating a blockchain token that contains a link to the digital file. The additional actions—including the storing of the original file—are incidental. And relying upon incidental functions as the cornerstone of policy in an entirely new area is not a good policy for various reasons. First, players may shift their practices accordingly if courts attach copyright liability to platforms or to NFT sellers based on these ancillary functions. It is easy to imagine NFT platforms that avoid all these ancillary functions and rely on linking alone.

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132. Noh et al., *supra* note 56, at 326.

133. *See generally* Helman, *supra* note 5 (analyzing the effects of applying copyrights to file sharing technology).

Second, conceptually, regulation through ancillary activities is often destructive. Such regulation is not only likely to be ineffective in curbing infringement, but it also represents waste, opportunity costs, and inefficient use of innovative resources, which are directed towards avoiding liability.[134] In fact, the history of copyright law and technology is riddled with such attempts and failures. In the file sharing context, for example, the attempts to "catch" Napster for contributory infringement for providing means to its users to commit copyright infringement through its central server model has spurred the development of the next generation of file sharing platforms, such as KaZaa, eDonkey, and eMule.[135] In an attempt to avoid liability, these platforms used a decentralized model that did not rely on a central index, which brought on a new round of litigation, where they were also ultimately found liable for contributory infringement.[136] This is not to say that copyright law had to necessarily accept or allow file sharing. But the attempt to regulate file sharing by pointing to the services' activities that were not vital for their functions naturally pushed them to keep providing the services without performing these activities.[137] The more general lesson here is that a regulation that focuses on peripheral features of technology can lead to the design of alternative technologies that attempt bypassing the regulation, necessitating further regulation efforts in a never-ending cycle. It is better to decide on the matter directly—i.e., focus on the core function of the technology that impacts copyright policy—rather than on incidental features. Ultimately, focusing on the incidental features of a technology tool rather than deciding on the core technology itself may yield an inefficient result.

Consider now the secondary liability regime as a vehicle to deter unauthorized minting of NFTs. NFT minting clearly enables and leads to copyright infringement by others. Indeed, the person who mints an NFT to a copy of the work, even if this copy is an authorized copy (let alone if the copy is not authorized), triggers unauthorized copying, display, and distribution of the works by various other players. For example, minting prompts platforms that offer NFTs for sale to copy and display copies of the works to promote their sale. Minting also enables buyers of NFTs to copy the underlying work and present it in their wallets or on their social media accounts. The secondary liability

134. *See id.* at 140-41.

135. *See id.*

136. *Id.*

137. In a way, deciding whether a copyright infringement has occurred based on the activities performed is natural and results from the structure of copyright law, which enumerated the rights that copyright owners have based on the activities that the rightsholder can exclusively perform or authorize. *See* 17 U.S.C. § 106. Yet, the more ancillary these activities are to the function of the infringer, the less likely it is that relying on the unwanted activity as the source of infringement will put an effective halt to the undesired phenomenon.

regime can form a basis to place liability on the person who minted the NFT for copyright infringements committed by another, even if her own actions did not interfere with the underlying work at all.

Two long-standing copyright doctrines for secondary liability exist: contributory infringement and vicarious liability.[138] Contributory infringement liability arises when a person, knowingly and materially, contributes to an infringing act of another person.[139] Vicarious liability arises in cases in which a person has both a direct financial interest in the infringement and the right and ability to supervise it.[140] These doctrines, as well as their counterparts in patents and trademarks, originated from common tort law but have significantly diverged from their foundations.[141]

Plausibly, at least some of the cases described above could meet the conditions of contributory infringement liability. Unauthorized minting materially contributes to and, in fact, provides the basis for all the infringements that subsequent players, such as buyers and platforms, commit with respect to the underlying work. While some cases may raise questions regarding the knowledge requirement, this requirement has been expanded to include actual as well as constructive knowledge, thus lowering the bar for finding liability.[142] Vicarious

138. *See, e.g.*, ROBERT A. GORMAN & JANE C. GINSBURG, COPYRIGHT: CASES AND MATERIALS 782 (6th ed. 2002).

139. As stated in the seminal case of *Gershwin Publishing Corp. v. Columbia Artists Management, Inc.*, a defendant will be held contributorily liable when, while having "knowledge of the infringing activity, [she] induces, causes or materially contributes to the infringing conduct of another." 443 F.2d 1159, 1162 (2d Cir. 1971) (citation omitted). Contributory infringement was established by the Supreme Court as far back as 1908 and was firmly instituted in the 1970s. *See* Scribner v. Straus, 210 U.S. 352, 355 (1908); Kalem Co. v. Harper Bros., 222 U.S. 55, 62-63 (1911); Screen Gems-Columbia Music, Inc. v. Mark-Fi Recs., Inc., 256 F. Supp. 399, 401-03 (S.D.N.Y. 1966); Fonovisa, Inc. v. Cherry Auction, Inc., 76 F.3d 259, 264 (9th Cir. 1996); Cable/Home Commc'n Corp. v. Network Prods., Inc., 902 F.2d 829, 845-46 (11th Cir. 1990); Religious Tech. Ctr. v. Netcom On-Line Commc'n Servs., Inc., 907 F. Supp. 1361, 1373 (N.D. Cal. 1995); Demetriades v. Kaufmann, 690 F. Supp. 289, 293 (S.D.N.Y. 1988); *see also* Peter S. Menell & David Nimmer, *Legal Realism in Action: Indirect Copyright Liability's Continuing Tort Framework and* Sony*'s De Facto Demise*, 55 UCLA L. REV. 143, 153 (2007).

140. Vicarious liability originated in the contexts of employment and independent contracting, based on the general agency theory of respondeat superior. *See Fonovisa*, 76 F.3d at 261-62; Perfect 10, Inc. v. Visa Int'l Serv. Ass'n, 494 F.3d 788, 802 (9th Cir. 2007), *cert. denied*, 553 U.S. 1079 (2008). The doctrine was expanded in the case of *Shapiro, Bernstein & Co. v. H.L. Green Co.*, 316 F.2d 304, 307 (2d Cir. 1963).

141. *See, e.g.*, GORMAN & GINSBURG, *supra* note 138, at 782; Lawrence v. Dana, 15 F. Cas. 26, 61 (C.C.D. Mass. 1869) (No. 8,136) ("[W]hoever invades [copyright] . . . commits a tort . . . ."); Ted Browne Music Co. v. Fowler, 290 F. 751, 754 (2d Cir. 1923) ("Courts have long recognized that infringement of a copyright is a tort . . . ."); *see also* Charles W. Adams, *Indirect Infringement from a Tort Law Perspective*, 42 U. RICH. L. REV. 635, 637 n.8, 674 (2008) (arguing that courts should refer to tort law principles when analyzing secondary liability of intellectual property and conform to them in the absence of persuasive counter reasons).

142. This interpretation was based on *Gershwin*'s reading of previous cases and the application of this reading later on. *See Gershwin*, 443 F.2d at 1162; Casella v. Morris, 820 F.2d 362, 365 (11th Cir. 1987); Ellison v. Robertson, 357 F.3d 1072, 1076 (9th Cir. 2004).

liability may also be established in some cases of unauthorized minting. The person who minted the NFT would typically have a financial interest in the infringement of the platform (which helps with selling the NFT) and perhaps even in that of the buyer (such as a reputational interest). It may be more difficult to establish "a right and ability to supervise the infringement."[143] Many of the rules that control the NFT transaction are not determined by the person who mints the NFT. Such rules can be determined by the platform or even dictated by the blockchain protocol or other technical limitations. Yet, the person who mints the NFT maintains rather powerful control over the transaction to the extent he or she is allowed to determine or modify the default contractual terms. To the best of our knowledge, no case law exists so far on whether such control can satisfy the standard for vicarious liability, and the answer may well depend on the specifics of the case.

Yet, the use of the secondary liability mechanism to address the issue of unauthorized minting is somewhat at odds with the typical use case of secondary liability in technology spaces. Typically, secondary liability doctrines are employed to impose liability on platforms and other big players who facilitate infringement by multiple end-users. Imposing liability in such cases is justified, inter alia, as a practical means of preventing mass infringements by controlling the head of the dissemination chain. In the present context, the same tools are invoked to impose liability on end-users who mint NFTs for the actions of the platforms, among others. While this is not a formal bar to the application of secondary liability doctrines in NFTs cases, it is also not an intuitive application of such doctrines.

Another option to harness copyright to create exclusive minting rights is to add an exclusive minting right to section 106 of the Copyright Act. This, we believe, is the worst option of all. Technology-specific exclusive rights are at odds with the structure of copyright law and can have significant negative consequences. Specifically, technology-specific exclusive rights can be difficult to define and enforce in a rapidly evolving technological landscape. As new technologies emerge and existing technologies evolve, and as NFT markets transform, the practice of minting may disappear or change dramatically. It may then become difficult to determine which technologies fall under the scope of the exclusive minting right. This can lead to legal uncertainty or to misled policy decisions. As a result of such policies, technology-specific exclusive rights that aim at NFTs can stifle the NFT market altogether

143. *See Gershwin*, 443 F.2d at 1162; *see also* A&M Recs., Inc. v. Napster, Inc., 239 F.3d 1004, 1022 (9th Cir. 2001) ("In the context of copyright law, vicarious liability extends beyond an employer/employee relationship to cases in which a defendant 'has the right and ability to supervise the infringing activity and also has a direct financial interest in such activities.' " (quoting *Fonovisa*, 76 F.3d at 262)).

in its infancy. Companies or individuals may be deterred from developing new NFT technologies or platforms. This can curb innovation and ultimately harm creators as well.

In sum, for unauthorized minting to constitute copyright infringement, the minting process itself must interfere with the enumerated exclusive rights. Remarkably, at least literally, it does not. Clearly, NFT minting is too recent and specific to be enumerated as a separate exclusive right, and indeed, no proposal to amend copyright law to include minting rights in the copyright holder's bundle of rights has been made yet. The inevitable conclusion of this discussion is that copyright law does not, for now, forbid unauthorized minting of NFTs.

B. Moral Rights

The unauthorized minting of an NFT may, in some cases, constitute infringement of an artist's moral rights. Moral rights derive from the continental European tradition and are enshrined in international treaties. These rights are intended to protect the personal connection between an author and their work. The strongest justification for using moral rights as a means of enforcing a policy against unauthorized minting is based on the personality theory.[144]

Article 6*bis*(1) of the Berne Convention requires that "the author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation."[145] After joining the Berne Convention, the United States Congress passed the Visual Artists Rights Act of 1990 (VARA), which recognizes moral rights of visual artists.[146] Compared to moral rights protections in Europe, however, the protection offered by VARA is quite narrow and subject to significant exceptions. As a result, the possibility of relying on VARA as an instrument for regulating unauthorized minting is quite limited. To begin with, a "work of visual art," which is the subject of moral rights protection in the United States, is defined in a rather narrow manner as "a painting, drawing, print, or sculpture, existing in a single copy, in a limited edition of 200 copies or fewer that are signed and consecutively numbered by the

144. For discussion, see *supra* Section II.B.2.

145. Berne Convention for the Protection of Literary and Artistic Works, art. 6bis(1), Sept. 9, 1886, S. TREATY DOC. NO. 99-27, 828 U.N.T.S. 221 (amended Sept. 28, 1979).

146. Visual Artists Rights Act of 1990, Pub. L. No. 101-650, 104 Stat. 5089, 5128.

author."[147] In contrast, the majority of digital artworks that typically underlie NFTs generally defy these constraints, thereby falling outside the bounds of this statutory definition.

Even if a certain work underlying an NFT meets the definition of a "work of visual art," it is not clear that unauthorized minting would implicate the moral rights recognized by VARA. Consider, first, the right of attribution, which is the right to have one's name associated with one's work. To the extent that the value of the NFT as a unique original depends, at least to an extent, on the reputation of the artist, the NFT minter would likely have no interest in omitting the artist's name. Nevertheless, in the uncommon cases where the file to which the token links does not name the author and no credit is given in the NFT metadata, the minting may be considered a violation of the right of attribution.

Other potential claims for a moral rights violation could actually be relevant when the original artist is credited for their work. Under the right of attribution, an artist can prevent the use of their name as the author of a "work of visual art" in the event of a "distortion, mutilation, or other modification of the work which would be prejudicial to [their] honor or reputation."[148] Relatedly, as part of the right of integrity, an artist can "prevent any intentional distortion, mutilation, or other modification of [their] work which would be prejudicial to [their] honor or reputation."[149]

Unauthorized minting of an artwork could arguably be considered prejudicial to an artist's honor or reputation, considering the strong objections that some artists may have to tokenization.[150] While NFTs have opened up new opportunities for artists to monetize their work, NFTs have also raised concerns about the potential environmental impact of blockchain technology and the commodification of art. The idea that everything and anything can be tokenized and sold can create an aversion for authors, especially those who view their work as a personal expression of their identity. In addition, the process of minting an NFT requires a significant amount of computing power and energy, leading some artists to question the sustainability and ethics of the NFT market and resist participation on these grounds. Forcing an artist to participate in the NFT market by minting their work without permission, particularly when it is done in a manner that could imply

147. 17 U.S.C. § 101. A "work of visual art" also includes "a still photographic image produced for exhibition purposes only, existing in a single copy that is signed by the author, or in a limited edition of 200 copies or fewer that are signed and consecutively numbered by the author." *Id.*

148. *Id.* § 106A(a)(2).

149. *Id.* § 106A(a)(3)(A).

150. *See, e.g.*, Zizi, *supra* note 33.

the artist's approval, arguably undermines the artist's autonomy and integrity as a creative individual and could thus be considered as prejudicial for their honor or reputation.

Alas, basing such a claim for a violation of moral rights on this type of argument is challenging not only because of the need to meet the narrow definition of "work of visual art" discussed above, but also because minting a work does not amount to its "distortion, mutilation, or other modification." Indeed, the broad phrase "or other derogatory action," which appears in the Berne Convention, is absent from VARA.[151] As a result, moral rights claims based on the context in which a work is used or displayed, rather than the physical integrity of the work itself, are generally not accommodated by VARA.[152] VARA also has an explicit public presentation exception, lobbied for by museums, stating that a modification that is the result of the public presentation of the work does not violate VARA.[153] Thus, artists are not likely to have a claim under VARA in a case where their work is used in a context they find offensive or objectionable, such as in a political campaign for a candidate they oppose or in an advertisement for a product they hold harmful or unethical. Unauthorized minting, similarly, is not likely to be covered by VARA.

In conclusion, whereas unauthorized minting raises concerns that moral rights are principally designed to protect, the limited protection offered by extant U.S. law in this context—in terms of both the type of works that enjoy protection and in the scope of protection—makes it difficult to rely on this area of the law as a basis for policymaking in this sphere. In addition, the type of harm that moral rights are designed to protect against would not necessarily exist in every case of unauthorized minting, and sometimes a moral rights claim (mostly ones that rely on the artist's aversion to minting) may conflict with compensatory claims under copyright law, to the extent such claims rely on the willingness of the artist to participate in NFT markets.

C. State Law Causes of Action

After examining the situation under copyright law, including the possibility of a moral rights claim under VARA, we turn our attention to state law causes of action that may be available in cases of unauthorized minting. These causes of action are not necessarily available

151. *See supra* Section III.B.

152. In some jurisdictions, the right of integrity also encompasses placing a work in a different context than originally intended by the author. In one famous case, for example, four Russian composers expressed objections to the use of their music in a film with an anti-Soviet theme. While an American court rejected their lawsuit, Shostakovich v. Twentieth Century-Fox Film Corp., 80 N.Y.S.2d 575 (N.Y. Sup. Ct. 1948), *aff'd*, 87 N.Y.S.2d 430 (N.Y. App. Div. 1949), a French court considered this as a violation of their moral rights, Soc. Le Chant de Monde v. Soc. Fox Europe et Soc., Cour d'appel [CA] [regional court of appeal] Paris, Jan. 13, 1953.

153. 17 U.S.C. § 106A(c)(2).

in every state and may be subject to variations in state law. Nonetheless, familiarity with these potential claims is essential for understanding the current legal landscape surrounding the NFT market.

Although federal law is the main source of intellectual property law, there is a rather significant amount of state law that establishes rights for intangible assets such as information, ideas, and goodwill. This body of state law has been developed almost entirely by state courts.[154] One such product of common law evolution is the doctrine of misappropriation, which is based on principles of unjust enrichment. Misappropriation actually originated at the federal level, in the Supreme Court's decision of *International News Services v. Associated Press*. This case awarded quasi-property protection to "hot news," a type of factual information ordinarily ineligible for copyright protection.[155] Operating in the shadow of federal preemption of copyright-like causes,[156] the misappropriation doctrine has seldom been argued by litigants. Nonetheless, the doctrine subsists in several states and has extended way beyond "hot news" to protect intangibles in a variety of circumstances.[157]

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154. *See* Shyamkrishna Balganesh, *The Pragmatic Incrementalism of Common Law Intellectual Property*, 63 VAND. L. REV. 1543, 1544-45 (2010).

155. *See* Int'l News Serv. v. Associated Press, 248 U.S. 215, 236, 242 (1918). For more on the case and its background, see generally Balganesh, *supra* note 154, at 1560-61; Douglas G. Baird, *The Story of* INS v. AP*: Property, Natural Monopoly, and the Uneasy Legacy of a Concocted Controversy*, *in* INTELLECTUAL PROPERTY STORIES 9 (Jane C. Ginsburg & Rochelle Cooper Dreyfuss eds., 2006).

156. Under the federal preemption doctrine, in the case of a conflict between a state law and a federal law, the federal law controls. *See, e.g.*, Camilla A. Hrdy, *The Reemergence of State Anti-Patent Law*, 89 U. COLO. L. REV. 133, 158 (2018) (" 'Preemption' generally describes a situation in which federal law 'preempts,' or supersedes, a state or local law."); Dmitry Karshtedt, *Contracting for a Return to the USPTO:* Inter Partes *Reexaminations as the Exclusive Outlet for Licensee Challenges to Patent Validity*, 51 IDEA 309, 316-17 (2011) (noting that under the preemption doctrine, in the case of a conflict between federal and state law, the federal law controls and the state law is invalidated). Preemption analysis is typically conducted under the Supremacy Clause of Article VI of the Constitution, which provides that the laws of the United States "shall be the supreme Law of the Land[,] . . . any Thing in the Constitution or Laws of any State to the Contrary notwithstanding." U.S. CONST. art. VI, cl. 2; *see* Hrdy, *supra*, at 158. Thus, when a state law interferes with the underlying goals of a federal law, it may be struck down as preempted. For other sources discussing preemption and intellectual property laws, see generally Roger Allan Ford, *The Uneasy Case for Patent Federalism*, 2017 WIS. L. REV. 551, 561-68; Paul R. Gugliuzza, *Patent Trolls and Preemption*, 101 VA. L. REV. 1579, 1600-08 (2015); Jeanne C. Fromer, *The Intellectual Property Clause's Preemptive Effect*, *in* INTELLECTUAL PROPERTY AND THE COMMON LAW 265, 271-81 (Shyamkrishna Balganesh ed., 2013); Mark A. Lemley, *Beyond Preemption: The Law and Policy of Intellectual Property Licensing*, 87 CALIF. L. REV. 111, 136-51 (1999); Maureen A. O'Rourke, *Drawing the Boundary Between Copyright and Contract: Copyright Preemption of Software License Terms*, 45 DUKE L.J. 479, 517-41 (1995); Joan E. Schaffner, *Patent Preemption Unlocked*, 1995 WIS. L. REV. 1081, 1097-1114; Dan L. Burk, *Protection of Trade Secrets in Outer Space Activity: A Study in Federal Preemption*, 23 SETON HALL L. REV. 560, 584-94, 608-33 (1993); Paul Heald, *Federal Intellectual Property Law and the Economics of Preemption*, 76 IOWA L. REV. 959, 967-1009 (1991).

157. *See* Balganesh, *supra* note 154, at 1561-62.

Unauthorized minting seems to be a good candidate for an application of the misappropriation doctrine. Creating an NFT without the author's permission is, after all, a brazen example of using someone else's intellectual creation for commercial gain, which is a form of unjust enrichment that the misappropriation doctrine aims to remedy. One advantage of applying such a common law doctrine in the context of new technologies that copyright law has not yet been equipped to deal with, like NFTs, has to do with the "pragmatic incrementalism" approach employed by courts when applying the common law.[158] Courts that use a common law doctrine, such as misappropriation, can develop it in a gradual and cautious manner while responding to ongoing changes in the rapidly evolving commercial and technological environment surrounding NFTs.

In certain cases, it is the buyer of an NFT that was minted without authorization who may have a cause of action under state law.[159] This could be relevant particularly if the seller of such an NFT falsely represents to the buyer—as part of the description or title of the NFT on the platform's website or otherwise—that the seller is the author of the underlying work or that the seller has obtained authorization from the author to create and sell the NFT. In such a case, the buyer may have a cause of action under torts such as intentional or negligent misrepresentation, if he can prove that he relied on the seller's misrepresentation in making the purchase. In such circumstances, in addition to torts, the buyer may also have a claim in contract law against the seller. While these legal actions are set out to protect the interest of the buyers in misrepresentation scenarios,[160] to the extent they deter unauthorized minting, the use of these claims can also contribute to the interests of artists and society as a whole in preserving authenticity in the NFT space.

In summary, several state law actions may be available in cases of unauthorized minting. These include misappropriation, tort law claims, contract law claims, and other causes of actions that may exist in certain states. While these legal tools may provide remedies to aggrieved parties and serve a role in regulating the NFT space, there are obviously some shortcomings with relying on such state law actions, a

158. *Id.* at 1545.

159. For an example of a lawsuit filed by an aggrieved NFT buyer, though not in the context of unauthorized minting, see Complaint & Demand for Jury Trial at 3, Thayer v. Furie, No. 2:22-cv-01640 (C.D. Cal. Mar. 12, 2022). The suit was filed against crypto artist Matt Furie for allegedly misrepresenting the number of NFTs that would ultimately be offered up in furtherance of a "scheme to artificially inflate the value" of his FEELSGOODMAN Rare Pepe Card NFT. *Id.* at 3. In the complaint, Halston Thayer alleged that Furie falsely advertised that only one of his Pepe NFTs would be made available. *Id.* at 2. Thayer set out a variety of claims, including fraudulent inducement, intentional misrepresentation, negligent misrepresentation, and violation of unfair competition law. *Id.*

160. *Cf.* Juliet M. Moringiello & Christopher K. Odinet, *The Property Law of Tokens*, 74 FLA. L. REV. 607, 664 (2022) (describing misrepresentation of facts by NFT platforms while promoting NFTs as a major consumer protection issue).

major one of which is the lack of uniformity across jurisdictions. Different states may have different laws and standards for the various legal claims discussed in this Section. Additionally, state law may be subject to preemption by federal law in some cases. The use of state law actions may require courts to engage in a complex choice of law analysis. Relying on this area of the law as a major tool in regulating NFTs is thus not likely to bring about the clarity and certainty that is needed in order for NFTs to fulfill their potentially beneficial role in the creative realm.

CONCLUSION

Minting of NFTs without the authorization of the authors of the underlying works is notoriously prevalent. Unauthorized minting of NFTs is commonly acknowledged as a concern, yet it is in fact uncertain what legal rule, if any, grants authors the exclusive right to mint or authorize the minting of NFTs of their works. While certainty in this area is imperative, no thorough analysis thus far has provided policymakers with the theoretical grounds for decisionmaking in this realm. This Article has undertaken to fill this gap.

This Article confirms the intuition that unauthorized minting should be banned. A policy that would require authors to confirm the minting of NFTs of their works will dramatically boost the incentive to create while at the same time maintain the same level of access to digital works. If successful, this feature of NFTs would tackle the most serious challenge of copyrights in the digital age: embracing the Internet's sharing capabilities without stifling authors' incentives to create. An exclusive minting rights policy would also align well with prime copyright theoretical underpinnings and further contemporary objectives of the copyright regime: distributive justice and diversity of art production.

However, copyright law and related regimes that pertain to rights in intangible assets do not address this issue presently in a cohesive and comprehensive manner. Copyright law evidently does not directly cover the practice of unauthorized NFT minting, and any attempt to extend it beyond its natural scope may come at high costs. Moral rights—to the extent that they can serve to protect against unauthorized minting—are rarely and narrowly available in the United States. Finally, relevant state laws are only partially applicable to NFTs and are generally preempted by the federal system in the copyright context. Instead, copyright holders that wish to act against unauthorized minting have a patchwork of legal norms that they can try utilizing to establish a case ad hoc.

In a way, this is unfortunate. The current state of the law surrounding unauthorized NFT minting produces uncertainties and drifts away from what could have been an efficient and just equilibrium in this

area. On the other hand, it may be that the array of norms that control this area, together, produce a substantial enough deterrence against unauthorized minting. While uncertainty as to the applicable norm will likely increase litigation costs, such costs may be lower than the costs of any of the other alternatives explored in this Article. Ultimately, it remains to be seen whether the goal of establishing a regime of exclusive minting rights is effectively advanced under the current state of the law.

There is a broader lesson here for law and technology. Every so often, a technology arises that threatens to tilt the delicate balance that copyright law strives to strike. The structure of the copyright regime turns the important balancing questions on rather technical details: Did copying occur? Was a copy of the work distributed? Having copyright policy depend on such technical details has severe costs. It creates powerful incentives for market players to design technologies for avoidance of liability rather than for efficiency; it generates severe uncertainties; and most importantly, it provides limited tools for policymakers to decide matters based on substantive considerations and market effects rather than on random technicalities. In this sense, NFTs could be a case in point in learning the limits of policymaking in the copyright arena.