

THE BONA FIDE ACQUISITION RULE APPLIED TO CRYPTOCURRENCY

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I. INTRODUCTION

Cryptocurrency is an attractive target for theft. This digital property is compact, portable, and subject to conversion by simply acquiring the private key, giving unfettered control to the key's associated cryptocurrency. Crypto-theft may occur without any physical interaction with the true owner. Crypto-thieves are difficult to identify and—even when identified—are often out of the practical jurisdictional reach of owners seeking recovery. The blockchain, a public ledger underpinning any cryptocurrency, creates a permanent record of all transactions. A victim of theft can follow the digital transaction trail to identifiable third-parties several orders removed from the actual theft. A true owner's only available remedy may be asserting claims against these innocent third parties. However, the bona fide acquisition rule works to protect good faith purchasers who acquire property without notice of misconduct. Are the principles justifying the bona fide acquisition rule fulfilled if applied to cryptocurrencies?

Users of cryptocurrencies largely rely on third-party services to exchange their value in one virtual currency into traditional fiat currencies or other cryptocurrencies.¹ Cryptocurrency exchanges provide this service,

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¹ See generally Andrew Balthazor, Comment, *The Challenges of Cryptocurrency Recovery*, 13 FIU L. REV. (forthcoming 2019) (manuscript at 13–14) (describing the role

like commodities or securities exchanges.² Using these services generally requires cryptocurrency owners to surrender possession to the third-party exchange.³ This creates hoards of virtual assets consolidated and entrusted to exchanges. Exchanges, in turn, become targets of thieves.

In 2013—the early days of Bitcoin—Tokyo-based Mt. Gox was the global king of cryptocurrency exchanges.⁴ Users relied on Mt. Gox to shepherd hundreds of millions of dollars in bitcoin, and in 2013 those users saw bitcoin’s value explode over 9,230%.⁵ Mt. Gox’s software and security did not keep up with the rapidly increasing value of assets under its care.⁶ Hackers struck repeatedly.⁷ Over a period of several years, crypto-thieves siphoned off approximately 850,000 bitcoins,⁸ worth billions of U.S. dollars in today’s value.⁹ Mt. Gox collapsed into bankruptcy.¹⁰ Mark Karpeles, the owner and operator of Mt. Gox, allegedly squirreled away a significant sum¹¹ from his company’s fiat currency bank accounts.¹² The users of the exchange filed a class action against Karpeles and Mizuho Bank, the Japanese bank with which Karpeles conducted business.¹³ Notably absent as defendants were the thieves themselves, who were the primary cause of the plaintiffs’ loss. While Karpeles and the bank may bear some responsibility for the stolen bitcoin, why not pursue the crypto-thieves themselves? The hackers had control of the stolen assets, after all.

of cryptocurrency exchanges).

² See, e.g., *How to Buy Bitcoin*, COINBASE, <https://www.coinbase.com/buy-bitcoin> [<https://perma.cc/Z5TV-MW2N>].

³ Steve Stecklow, Alexandra Harney, Anna Irrera & Jemima Kelly, *Special Report: Chaos and Hackers Stalk Investors on Cryptocurrency Exchanges*, REUTERS (Sept. 29, 2017, 6:55 PM), <https://www.reuters.com/article/legal-bitcoin-exchanges-risks/special-report-chaos-and-hackers-stalk-investors-on-cryptocurrency-exchanges-idUSKCN1C42JV> [<https://perma.cc/G8S6-8S6Q>] (“These exchanges, which match buyers and sellers and sometimes hold traders’ funds, have become magnets for fraud and mires of technological dysfunction . . .”).

⁴ Robert McMillan, *The Inside Story of Mt. Gox, Bitcoin’s \$460 Million Disaster*, WIRED (Mar. 3, 2014), <https://www.wired.com/2014/03/bitcoin-exchange/> [<https://perma.cc/D95T-E5A5>].

⁵ See *id.* (describing Bitcoin prices jumping from \$13 to over \$1200).

⁶ See *id.*

⁷ *Id.*

⁸ *Id.*

⁹ See *Bitcoin (USD) Price*, COINDESK, <https://www.coindesk.com/price/> [<https://perma.cc/CW7F-67JU>].

¹⁰ McMillan, *supra* note 4.

¹¹ *Id.*

¹² *Greene v. Mizuho Bank Ltd.*, 206 F. Supp. 3d 1362, 1368 (N.D. Ill. 2016). Fiat currencies are traditional, government-backed currencies.

¹³ See *id.* at 1369–70.

The publicly viewable ledger technology underpinning all cryptocurrencies—the blockchain—allows users to trace virtual currency transactions.¹⁴ A wrongfully dispossessed cryptocurrency owner with a simple web browser can follow the digital trail of stolen assets.¹⁵ But, while the blockchain allows transaction tracing, it is pseudonymous: users conducting blockchain-based transactions are only identified by an alphanumeric public address, the functional equivalent of a conventional bank account number.¹⁶ Linking a cryptocurrency public address with an identifiable individual requires information not available on the blockchain.¹⁷ For example, some cryptocurrency exchanges maintain records personally identifying users in response to know-your-customer (KYC) regulations.¹⁸ A user could trace a series of blockchain transactions to a cryptocurrency exchange that maintains KYC records and identify the cryptocurrency recipient.¹⁹

Crypto-thieves are necessarily motivated to avoid blockchain transactions that could reveal their identity. But while this anonymity may prevent identification of the bad actors directly responsible for a cryptocurrency theft, the stolen virtual assets are still tied to the blockchain and, consequently, traceable. Eventually, thieves realize the value of their stolen cryptocurrency by selling the stolen currency for another virtual currency, fiat currency, or real-world goods.²⁰ Some of

¹⁴ See John Bohannon, *Why Criminals Can't Hide Behind Bitcoin*, SCI. MAG. (Mar. 9, 2016), <https://www.sciencemag.org/news/2016/03/why-criminals-cant-hide-behind-bitcoin> [<https://perma.cc/G9DN-NBC5>]; e.g., Nathaniel Popper, *Bitcoin's 'First Felon' Faces More Legal Trouble*, N.Y. TIMES (Nov. 2, 2018), <https://www.nytimes.com/2018/11/02/technology/bitcoin-charlie-shrem-winklevoss-twins.html> [<https://perma.cc/NBV8-8C2B>] (“‘When he purchased \$4 million in real estate, two Maseratis and two powerboats, we decided it was time to get to the bottom of it,’ Mr. Winklevoss told The New York Times. The brothers hired an investigator, who found that 5,000 Bitcoins were transferred in 2013 through addresses associated with Mr. Shrem and onto the Bitcoin wallet services Xapo and Coinbase, according to the complaint. The investigator traced the money on the blockchain, the public ledger where all Bitcoin transactions are recorded.”).

¹⁵ See, e.g., *Bitcoin Block Explorer*, BLOCKCHAIN, <https://www.blockchain.com/explorer> [<https://perma.cc/LZ79-KTHU>].

¹⁶ Bohannon, *supra* note 14.

¹⁷ See *id.*

¹⁸ See Kavid Singh, *The New Wild West: Preventing Money Laundering in the Bitcoin Network*, 13 NW. J. TECH. & INTELL. PROP. 37, 60 (2015).

¹⁹ See Jason Luu & Edward J. Imwinkelried, *The Challenge of Bitcoin Pseudo-Anonymity to Computer Forensics*, U.C. DAVIS LEGAL STUD. RES. PAPER SERIES, Research Paper No. 462, at 29 (2015), <http://ssrn.com/abstract=2671921> [<https://perma.cc/P4KV-MMPY>] (discussing the identification of Bitcoin users by tracing transactions to known “chokepoints in the Bitcoin economy such as exchanges”).

²⁰ See Singh, *supra* note 18 (“[M]oney laundering in Bitcoin usually bleeds outside of the virtual network eventually. If the owner converts her bitcoins into USD at another Bitcoin

these buyers may be innocent purchasers unaware that they are acquiring stolen cryptocurrency.

Unlike crypto-thieves, innocent purchasers of stolen cryptocurrency have no reason to take measures to disguise their identity (at least, no reasons connected to the stolen cryptocurrency). An innocent purchaser is thus more likely to interact with vendors or cryptocurrency exchanges that maintain KYC records. Accordingly, there is a better chance of identifying innocent purchasers of stolen cryptocurrency than identifying the crypto-thieves themselves.

Whether a wrongfully dispossessed owner of cryptocurrency may recover cryptocurrency from an innocent purchaser depends on the application of the bona fide acquisition rule. Bona fide purchasers of value who purchase stolen property in good faith, without notice that the property is stolen, acquire title to that stolen property free from prior claims in some contexts but not in others. Whether the bona fide acquisition rule should apply depends on the purposes of the rule and whether the rule's purposes are fulfilled as applied to particular property types.

This paper discusses the application of the bona fide acquisition rule to cryptocurrencies. In Section II, this paper provides a brief functional primer on cryptocurrency and crypto-theft. Section III describes the practical and policy reasons for the bona fide acquisition rule, why it applies to some types of property and not others, and the unsatisfactory outcome of treating cryptocurrency as if it were one of these property types. Section IV concludes that harnessing the power of cryptocurrencies would achieve the practical and policy objectives of the bona fide acquisition rule. Cryptocurrencies could protect the property interests of owners by incorporating robust transactional information—giving notice of illicit transactions and secured interests—which would use the potential of cryptocurrencies' distributed public ledger. Such improvements would place cryptocurrencies into a property class unto themselves, able to efficiently protect earlier-in-time possessory and security interests, while simultaneously allowing free-flowing transactions and giving purchasers confidence that their acquired cryptocurrency is devoid of prior adverse claims.

currency exchange—which is the most likely scenario—the exchange will require her to provide identifying information for transactions pursuant to [KYC] requirements, thus leaving a trail outside of Bitcoin for law enforcement to follow.”) (internal citations omitted).

II. A PRIMER ON CRYPTOCURRENCY AND CRYPTO-THEFT

Modern cryptocurrencies are distributed software systems that allocate units of value to addresses and allow for the exchange of those units between addresses on the same system.²¹ When dealing with the Bitcoin cryptocurrency, those value units are bitcoins, or fractions thereof. Because Bitcoin is the original blockchain-based cryptocurrency,²² this paper uses bitcoin as a generic term for cryptocurrency value units. Many derivative cryptocurrencies now exist, but most cryptocurrencies share the same functional characteristics described herein.

New bitcoin is generated through a process called mining, which is an incentive-based process that contributes to transaction authentication and is reliant on encryption.²³ Every bitcoin is allocated to a public key address represented by alphanumeric characters;²⁴ when bitcoin is generated by mining, that bitcoin is credited to the miner's public address. Sending bitcoin from a public key address requires that address's private key, a separate alphanumeric code.²⁵ The private key is the exclusive means of initiating outgoing transactions from an address, and anyone with access to the private key has unrestricted control over the associated address's bitcoin.²⁶ The cryptocurrency software authenticates a transaction by checking that the private key is correct and that the requested bitcoin is available to the sending address.²⁷ Once a transaction is authenticated, the bitcoin is essentially debited from the sending address, credited to the receiving address, and the transaction is added to the blockchain.²⁸ Transactions are authenticated in batches, called blocks, and then strung together to form a chain of transactions: the blockchain.²⁹

The blockchain provides a publicly viewable history of all transactions, beginning with a bitcoin's generation.³⁰ Perhaps counter-intuitively, the blockchain does not maintain a static list of "account

²¹ See generally Balthazor, *supra* note 1, at *6 (describing cryptocurrencies).

²² *FAQ*, BITCOIN PROJECT, <https://bitcoin.org/en/faq> [<https://perma.cc/SVT6-LSJG>]; see also David Lee Kuo Chuen et al., *Cryptocurrency: A New Investment Opportunity?*, 20 J. ALTERNATIVE INV. 16, 17–18 (2018) (describing earlier digital currencies and cryptocurrencies pre-dating Bitcoin).

²³ See Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, BITCOIN PROJECT, *4, <http://bitcoin.org/bitcoin.pdf> [<https://perma.cc/NWV7-MZHK>].

²⁴ See *id.* at *7.

²⁵ *Id.*

²⁶ See *id.* at *10.

²⁷ *Id.* at *8.

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.* at *10.

balances” for all bitcoin addresses.³¹ Software interfacing with the bitcoin’s blockchain determines the amount of bitcoin associated with an address by calculating the sum of all incoming and outgoing transactions relating to an address.³² But this sum is an abstraction of bitcoin’s reality: ownership of bitcoin is instead “a share in an informally organized social process,”³³ and that share’s value is only recognized by knowing all of an address’s incoming and outgoing transactions. For example, take real-world cash: a person can count their money by opening their wallet. With bitcoin, your “wallet” only contains a reference to a list of all receipts and expenditures you have ever made. You only know how much bitcoin you control by calculating the sum of those transactions. Transactions added to the blockchain are functionally irrevocable due to the cryptography involved and distributed software authentication, an intentional feature designed to prevent double-spending.³⁴

Crypto-theft occurs when a person dispossesses the rightful owner of the address’s bitcoin without the true owner’s consent. This may happen because the private key (which controls the bitcoin address) was compromised, which is what occurred in the Mt. Gox hack.³⁵ Private keys are stored in any number of ways: digitally, online, offline, encoded into devices, or written down on paper.³⁶ Crypto-thieves acquire an address’s private key by hacking, malware, social engineering, coercion, or any other manner of taking the private key from a person.³⁷ The thief then uses the stolen private key to send the address’ bitcoin to another address under

³¹ *Id.* at *8.

³² *Id.*; *see, e.g.,* BLOCKCHAIN, <https://www.blockchain.com/btc/address/3D2oetdNuZUqQHPJmcMDDHYoqkyNVsFk9r> [<https://perma.cc/SE65-9Y6B>] (displaying the transactions and amount of bitcoin associated with an address—one of the largest hoards of bitcoin at the time of writing).

³³ Shawn Bayern, *Dynamic Common Law and Technological Change: The Classification of Bitcoin*, 71 WASH. & LEE L. REV. ONLINE 22, 30 (2014).

³⁴ *See* Nakamoto, *supra* note 23, at *1. Some cryptocurrency development teams have implemented or considered controversial “forks” to reverse the effects of vast amounts of illicitly transferred cryptocurrency. These forks are changes to the software underlying a cryptocurrency to reset a blockchain to a prior state or to create wholly new cryptocurrencies to compensate victims. *See, e.g.,* Stan Higgins, *8 Million Vericoïn Hack Prompts Hard Fork to Recover Funds*, COINDESK (July 14, 2014), <https://www.coindesk.com/bitcoin-protected-vericoïn-stolen-mintpal-wallet-breach> [<https://perma.cc/TBW6-RPB5>].

³⁵ *See* McMillan, *supra* note 4.

³⁶ *See* Max I Raskin, *Realm of the Coin: Bitcoin and Civil Procedure*, 20 FORDHAM J. CORP. & FIN. L. 969, 989 (2015).

³⁷ *See, e.g.,* Mariella Moon, *Cryptocurrency Expert Kidnapped for \$1 Million Bitcoin Ransom*, ENGADGET (Dec. 30, 2017), <https://www.engadget.com/2017/12/30/cryptocurrency-expert-kidnap-1-million-bitcoin/> [<https://perma.cc/9V6M-XMS2>].

the thief's control, stealing the bitcoin from the true owner.³⁸ Alternatively, an owner may be extorted or forced to transfer cryptocurrency to a thief's address without necessarily surrendering private keys. For example, criminals may infect a system with ransomware (a form of malicious computer code), which infects a system and denies access to user files until a bitcoin payment is made to a specific address.³⁹

The cryptocurrency system itself provides no recourse to the victim of crypto-theft. Cryptocurrency transactions are irrevocable. Victims may trace transactions through the blockchain, but criminals with the skills to steal cryptocurrency are generally careful to avoid transactions that would allow a victim to identify them. Eventually, an innocent third party will acquire the stolen cryptocurrency. Unlike criminals, innocent third parties are not motivated to maintain anonymity by fear of prosecution. A victim of crypto-theft may identify the innocent third party through their transactions with entities like retail stores or cryptocurrency exchanges, which may have records tying the innocent third party to the transactions.

After a victim identifies the third-party possessor of the stolen cryptocurrency, can the victim assert claims against them? Answering this question requires examining the purposes of the bona fide acquisition rule and the results of applying it to cryptocurrencies.

III. RECOVERING STOLEN PROPERTY AND THE BONA FIDE ACQUISITION RULE

At common law, the general principle is that a true owner—one with a valid first-in-time interest—may recover their stolen property from whomever possesses it, even when the thief sells the stolen property to an innocent purchaser: a bona fide purchaser who, in good faith, purchases for value the property without notice of the theft.⁴⁰ This principle, originating in Roman law, was modified and adapted to suit the needs of changing economies with an exception for certain types of property: the bona fide acquisition rule.⁴¹ The bona fide acquisition rule allows an

³⁸ See, e.g., *id.*

³⁹ Kate O'Flaherty, *How to Survive a Ransomware Attack—And Not Get Hit Again*, FORBES (Aug. 17, 2018), <https://www.forbes.com/sites/kateoflahertyuk/2018/08/17/how-to-survive-a-ransomware-attack-and-not-get-hit-again/#46433ab86cd3> [<https://perma.cc/333R-VRBU>].

⁴⁰ Kenneth G.C. Reid, *Banknotes and their Vindication in Eighteenth-Century Scotland*, in *MONEY IN THE WESTERN LEGAL TRADITION: MIDDLE AGES TO BRETTON WOODS* 556, 564 (David Fox & Wolfgang Ernst eds., 2016) (“The principle was the familiar one of *nemo plus iuris ad alienum transferre potest, quam ipse habet*.”).

⁴¹ See *id.* at 566–68, 571–72.

innocent purchaser to acquire certain types of stolen property free from the risk that the property may be claimed by the former rightful owner.⁴² The rule arises from the concept that possession is strong evidence of ownership, and thus, an innocent purchaser is justified in relying on that presumed ownership.⁴³ When the rule applies, the former owner's remedy is limited to an action against the thief only.⁴⁴

For example, say a thief steals a unique piece of art and a pile of cash. An innocent third party with no notice of the theft then acquires the art for a substantial sum.⁴⁵ This third party does not have clean title; the true owner of that artwork may bring an action against the third-party purchaser, subject to certain limitations, and recover their stolen property.⁴⁶ If the same innocent third party sold the thief a car—thereby acquiring the thief's stolen pile of cash—that innocent third party acquires the pile of cash with good title, free and clear of any prior claims.⁴⁷

Thus, a true owner seeking to recover property from an innocent purchaser faces two possible scenarios dependent on the nature of the stolen property: (1) the innocent purchaser acquires the stolen property free from any prior adverse claim, preventing recovery by the true owner; or (2) the innocent purchaser acquires the stolen property subject to the claims of the true owner, allowing the true owner to recover. The bona fide acquisition rule represents a compromise between the competing interests of transaction efficiency and protection of ownership. Understanding this compromise requires a discussion of the rule's purpose and application with respect to money, personal property, and secured interests in intangible property and a determination as to whether the rule's purposes are served by treating cryptocurrency like any of these defined property types.

⁴² *See id.* at 566, 571.

⁴³ *See* UGO MATTEI, BASIC PRINCIPLES OF PROPERTY LAW: A COMPARATIVE LEGAL AND ECONOMIC INTRODUCTION 107 (2000) (discussing that possession of a physical object is strong evidence of ownership, creating a presumption that a possessor may rightfully transfer ownership to another).

⁴⁴ *See* Reid, *supra* note 40, at 568.

⁴⁵ *See, e.g.,* O'Keeffe v. Snyder, 416 A.2d 862, 865–66 (N.J. 1980) (inspiring this example).

⁴⁶ *See id.* at 867 (“[I]f the paintings were stolen, the thief acquired no title and could not transfer good title to others regardless of their good faith and ignorance of the theft.”).

⁴⁷ *See* David Fox, *Bona Fide Purchase and the Currency of Money*, 55 CAMBRIDGE L.J. 547, 547 (1996).

A. An Economic Explanation of the Two Legal Treatments of First-in-Time Interests in Stolen Property

An economic view of property law explains the different approaches to protecting the property interests of either the true owner or a later innocent purchaser. Property rules must protect ownership interests because there would be little incentive to own property and use it productively without such protection.⁴⁸ Property rules must also allow for efficient transfers of those interests to attain the most economic use of property.⁴⁹ To this end, a property system must reduce disputes between claimants with competing interests or allow for efficient dispute resolution. If there are too many disputes resulting in costly enforcement actions, then the high cost of dispute resolution reduces the efficiency of the overall system.⁵⁰

An economic property system encourages transfers of property to those people who value it most because those owners would be the most motivated to make the property most productive.⁵¹ Reducing the transaction costs of exchanging property is thus the lynchpin of any economic system.⁵² Transaction costs include all private and public costs of policy development and enactment, record searches, negotiations (transfer-related costs), dispute resolution, and enforcement.⁵³ Transaction costs tend to rise with the value of the property transacted because value attracts more competing parties and results in potentially conflicting claims.⁵⁴

⁴⁸ See Hans-Hermann Hoppe, *The Ethics and Economics of Private Property*, in THE ELGAR COMPANION TO THE ECONOMICS OF PROPERTY RIGHTS 48, 57 (Enrico Colombatto, ed., 2004) (“Men pay most attention to what is their own; they care less for what is common; or at any rate they care for it only to the extent to which each is individually concerned.”) (quoting Aristotle).

⁴⁹ See Gary D. Libecap, *The Effect of Transaction Costs in the Definition and Exchange of Property Rights: Two Cases from the American Experience*, in THE ELGAR COMPANION TO THE ECONOMICS OF PROPERTY RIGHTS 108, 108 (Enrico Colombatto, ed., 2004).

⁵⁰ See *id.* at 111.

⁵¹ See Hoppe, *supra* note 48, at 57 (explaining that people apply themselves to increasing the value of property when that property belongs to them).

⁵² See Libecap, *supra* note 49, at 108–09 (discussing the historical development of more economic property systems and concluding that “transaction costs mold bargaining for changes in property rights, influencing the positions of the parties involved and the nature of the institutions that ultimately result”).

⁵³ *Id.* at 109; see also Joshua Fairfield, *Bitproperty*, 88 S. CAL. L. REV. 805, 845 (2015) (“[P]roperty can best be explained as the process of optimizing property rights by reducing information costs for search, verification, or transfer.”).

⁵⁴ See Libecap, *supra* note 49, at 112.

These economic principles are manifested in the bona fide acquisition rule and its application (or not) to certain types of property. Innocent purchasers of property are protected where (1) frequent transactions in that property are critical to commerce and (2) title searches are so impractical as to place too great a cost or burden on each transaction relative to the value of the transacted property. Thus, the use of money favors bona fide purchasers: money is frequently transacted and impractical to trace.⁵⁵ Property that is traded less frequently, that has existing title registration systems, or that retains significant value after exchange, such as security interests or vehicles, justifies having higher transaction costs without a disproportionate impact on the free exchange of property.⁵⁶

B. Protecting the Free Flow of Commerce over First-in-Time Interests

One of the earliest exceptions to the general rule that a first-in-time true owner may recover their property from an innocent purchaser was grounded in practical evidentiary concerns. The exception is rooted in Roman law, the starting point of many Western common legal principles:

Should another's coins be paid, without the knowledge or volition of their owner, they remain the property of him to whom they belonged; should they have been mixed, it is written in the books of Gaius [Cassius Longinus] that should the blending be such that they cannot be identified, they become the property of the recipient so that their [former] owner acquires an action for theft against the man who gave them.⁵⁷

Thus, a true owner cannot recover stolen fungible property that is mixed with other like property because the stolen property is indistinguishable from property that belongs to another. This exception was based on issues of evidence, not of policy. English courts refined this exception for money, introducing an economic justification for the rule.

⁵⁵ See discussion, *infra* Section 1.

⁵⁶ See Jeanne L. Schroeder, *Bitcoin and the Uniform Commercial Code*, 24 U. MIAMI BUS. L. REV. 1, 36 (2016) (describing a rule requiring inquiry into title for certain classes of interests not overly burdensome because it would only affect a small class of property that are usually subject to title registration systems and that retain post-transaction value).

⁵⁷ See Reid, *supra* note 40, at 568 (quoting THE DIGEST OF JUSTINIAN (Alan Watson ed., 1985) (alterations in original)).

1. Money and the Bona Fide Acquisition Rule

Money is a broad category. Black's Law Dictionary defines money as "[t]he medium of exchange authorized or adopted by a government as part of its currency Assets that can be easily converted to cash Capital that is invested or traded as a commodity [and] Funds."⁵⁸ Courts have also defined money to mean "an object used to buy things,"⁵⁹ "a medium of exchange [convertible] into a currency which can pay for things,"⁶⁰ and "a measure of value, or a means of payment."⁶¹

The modern version of the bona fide acquisition rule came into being in the mid-18th century. The introduction of paper currency in late 17th century England and Scotland forced courts to decide matters involving bank notes stolen from true owners and presented for payment at banks.⁶² Early decisions regarding stolen bank notes denied true owners an action against an innocent possessor, relying on the maxim "money has no earmark."⁶³ True owners simply could not prove that a specific bank note belonged to them.

A Scottish attorney, Hew Crawford, challenged this maxim when he signed and recorded the serial numbers of two Bank of Scotland £20 notes—thereby specifically identifying them—prior to their theft in 1748.⁶⁴ Crawford had mailed the notes to a Glasgow merchant. When the notes failed to arrive, Crawford notified the Bank of Scotland and advertised the missing notes in newspapers, including the notes' identifying details: their serial numbers and Crawford's signature on each note. One of the missing notes turned up several months later, presented for payment to the Bank of Scotland. Crawford demanded return of the note; the Bank refused, believing itself obligated to pay the bearer. Crawford brought an action against the Bank for return of the note in *Crawford v. The Royal Bank*.⁶⁵ Crawford argued the general rule that possession is insufficient to transfer an interest in stolen property: "[T]he bare Possession of a Bank-note without the Consent of the Proprietor, will

⁵⁸ *Money*, BLACK'S LAW DICTIONARY (10th ed. 2014).

⁵⁹ *United States v. Ulbricht*, 31 F. Supp. 3d 540, 570 (S.D.N.Y. 2014).

⁶⁰ *Id.*

⁶¹ *United States v. Faiella*, 39 F. Supp. 3d 544, 545 (S.D.N.Y. 2014) (quoting *Money*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/money> [<https://perma.cc/EW4Y-PF5N>]).

⁶² Reid, *supra* note 40, at 568 & n.108 (citing Fox, *supra* note 47, at 559).

⁶³ See Fox, *supra* note 47, at 548.

⁶⁴ Reid, *supra* note 40, at 559.

⁶⁵ See *id.* at 561, 564.

no more transfer the Property than the bare Possession of a Table or a Chair.”⁶⁶

In retort, the Bank argued in favor of a rule benefiting a purchaser who acquires stolen money in good faith: “a rule of bona fide acquisition ‘is agreeable to the Practice of all trading Nations at this Day, who possibly without having much Regard to the Subtilties [sic], have embraced it for this very good Reason, that the contrary would at once put a Stop to all Trade.’”⁶⁷ The Bank was fundamentally making a policy argument.

Trade, it was argued for the banks, rested on the free circulation of money, and free circulation rested in turn on the reliability of notes and coins. If Crawford was able to vindicate the banknote, no merchant could risk taking money in payment “without being informed of the whole History of it from the Time that it was first issued out of the Bank or the Mint till it came to his Hand, which is so apparently absurd, that it seems hardly to merit a Consideration.” And as banknotes would thus be rendered “absolutely useless,” this would “in a great Measure deprive the Nation of the Benefit of the Banks, which could hardly subsist without the Circulation of their Notes.” If money could be vindicated, counsel for the Bank of Scotland concluded, “no Man could be sure, that one Shilling in his pocket was his own, and . . . Banks might shut their doors.”⁶⁸

The above argument has four components: (1) modern economies rely on money; (2) if a dispossessed owner could bring a claim for money, then everyone using money would have to inquire into the transaction history of money before accepting it as payment; (3) tracing the transaction history of money is “so apparently absurd, that it seems hardly to merit a Consideration”;⁶⁹ and (4) because transaction tracing is so difficult, people would stop using money to avoid the risk of a true owner recovering money from their possession.

The Bank prevailed. The Court created an exception for money, preventing victims of theft from asserting claims against innocent third-

⁶⁶ *Id.* at 564 (quoting MINUTES, THE GOVERNOR AND DIRECTORS OF THE BANK OF SCOTLAND AGAINST THE GOVERNORS AND DIRECTORS OF THE ROYAL BANK AND OTHERS 8 (Lord Strichen ed., 1749) (hereinafter BANK OF SCOTLAND MINUTES)).

⁶⁷ *Id.* at 566 n.90 (quoting BANK OF SCOTLAND MINUTES, *supra* note 66, at 5).

⁶⁸ *Id.* at 566 (internal citations omitted).

⁶⁹ BANK OF SCOTLAND MINUTES, *supra* note 66, at 5.

party purchasers and thereby conceived the modern bona fide acquisition rule. English courts adopted—without reference to the Scottish decision—the same rule ten years later in *Miller v. Race*.⁷⁰ American courts are in accord:

It has long been considered necessary for practical business transactions that one who receives money in due course of business shall not be put on inquiry as to the title of the one paying the same. The reason frequently assigned is that money bears no earmarks, and therefore cannot be traced. But this argument is not tenable, for in many states we find that even though the money can be traced directly into the payee's hand, still no recovery may be had even though the money has been stolen The real reason for such decision lies in the fact that money constitutes the currency of the nation, and by its use a civilized community is carried beyond the stage of barter.⁷¹

However, this American summary neglects a logically required component of the policy argument in favor of the bona fide acquisition rule. The absurdly high burden of tracing the transaction history of money, relative to the importance of preserving the free flow of money in a modern economy, justifies applying the bona fide acquisition rule and allowing the use of money without inquiry as to its provenance.⁷²

It follows that if the cost of tracing a transaction evolves to have little or no impact on the free flow of money, then this erodes the economic justification for the bona fide acquisition rule. Cryptocurrencies may represent this evolution in transaction tracing.

2. *Treating Cryptocurrency as Money*

Courts treat cryptocurrency as money or currency when they apply statutes that reference those terms and the statute itself provides no definition. Relying on plain meaning and dictionaries, courts classify

⁷⁰ See generally *Miller v. Race*, (1758) 97 Eng. Rep. 398 (K.B.); Reid, *supra* note 40, at 571.

⁷¹ C. Severin Buschmann & Leo M. Gardner, *Recovery of Stolen Money or Negotiable Instrument from Holder in Due Course—Is There an Indiana Rule?*, 5 IND. L.J. 195, 195 (1929).

⁷² In situations involving certain high value transactions we may require provenance of the funds used. Know-your-customer regulations and similar rules work to prevent money laundering and easy transfer of illicitly earned funds but are not intended to settle competing property interests. See Singh, *supra* note 18, at 45–46.

bitcoin as a medium of exchange and means of payment, meeting the definition of “money” or “funds” for statutes criminalizing conduct relating to money or funds.⁷³ *United States v. 50.44 Bitcoins* determined that bitcoin met the definition of money for property forfeiture relating to a money transmitting business.⁷⁴

The *50.44 Bitcoins* court’s decision was limited to determining that Bitcoin met a certain forfeiture statute’s definition of money but did not consider cryptocurrency in a broader property-rights context: whether the same property rules that apply to money should apply to cryptocurrency. The Uniform Commercial Code (UCC), a codification of common law principles governing commercial property transactions, excludes non-government-backed cryptocurrency from its definition of money: “‘Money’ means a medium of exchange currently authorized or adopted by a domestic or foreign government. The term includes a monetary unit of account established by an intergovernmental organization or by agreement between two or more countries.”⁷⁵ Few cryptocurrencies are government-backed; major currencies like Bitcoin are not.⁷⁶ Without governmental adoption or agreement, cryptocurrencies do not meet the UCC’s definition of money.⁷⁷ Thus, it seems unlikely that a court would apply the same property rules relating to money to cryptocurrencies, which—under the common law as codified in the UCC—are not money.

Additionally, some of the justifications for treating money as favored property for conveyances do not apply to cryptocurrencies. Notwithstanding Mr. Crawford’s attempt to keep track of his £20 note, money has no practical transaction recording system, and thus, there is no way to check its provenance.⁷⁸ Cryptocurrencies are the exact opposite. The blockchain reveals transaction histories of cryptocurrencies to the entire world. Thus, the transaction costs of verifying that any transaction involves only unburdened cryptocurrency are theoretically low. Low transaction costs for title-checking weigh in favor of protecting earlier-in-time interests against later innocent purchasers of stolen property.⁷⁹

⁷³ See *United States v. Faiella*, 39 F. Supp. 3d 544, 545 (S.D.N.Y. 2014); *United States v. Ulbricht*, 31 F. Supp. 3d 540, 570 (S.D.N.Y. 2014); *SEC v. Shavers*, No. 4:13-CV-416, 2013 WL 4028182 at *2 (E.D. Tex. Aug. 6, 2013).

⁷⁴ *United States v. 50.44 Bitcoins*, No. CV ELH-15-3692, 2016 WL 3049166, at *1 & n.1 (D. Md. May 31, 2016).

⁷⁵ U.C.C. § 1-201(b)(24) (AM. LAW INST. & UNIF. LAW COMM’N 2013).

⁷⁶ See Hilary Hestia & Nick Perry, *This Is the First Country to Adopt a Cryptocurrency As Its Official Currency*, MONEY (Mar. 5, 2018), <http://time.com/money/5186316/this-is-the-first-country-to-adopt-a-cryptocurrency-as-its-official-currency/> [<https://perma.cc/N8R2-42AL>].

⁷⁷ See Schroeder, *supra* note 56, at 20.

⁷⁸ See discussion, *supra* Section I.

⁷⁹ See discussion, *supra* Section A.A.

To treat cryptocurrencies like money for the purposes of the bona fide acquisition rule, a court would have to conclude that society's interest in free-flowing cryptocurrency transactions outweighs the transaction costs of verifying that a transaction was free from prior adverse claims.⁸⁰ For example, although the blockchain maintains transaction histories, it does not indicate when certain transactions are the product of crypto-theft.⁸¹ Purchasers would need to perform searches on third-party sites to verify that the addresses and transactions associated with a contemplated cryptocurrency transaction are free from reported misconduct.⁸² Even then, such searches may come up with nothing if a crypto-thief sufficiently obscures their transaction trail.⁸³ A court may determine that this onerous process is too great a burden on commerce.

Applying the bona fide acquisition rule to cryptocurrencies would protect innocent purchasers but would eliminate the only likely remedy true owners can employ to recover stolen bitcoin. The Internet-based nature of cryptocurrencies and crypto-theft presents two challenges to a wrongfully dispossessed owner seeking to recover stolen bitcoin.⁸⁴ First, crypto-thieves take measures to maintain anonymity. They are motivated to avoid engaging in blockchain-traceable transactions that could personally identify them. Second, even where a crypto-thief is identified, they may be in a jurisdiction that makes enforcement actions against them impractical.⁸⁵

⁸⁰ *See id.*

⁸¹ *Cf.* Izabella Kaminska, *Bitcoin's lien problem*, FIN. TIMES: ALPHAVILLE (Mar. 24, 2015), <https://ftalphaville.ft.com/2015/03/24/2122678/bitcoins-lien-problem/> [<https://perma.cc/T49Z-T9KT>] (noting that the blockchain does not store information about prior adverse claims).

⁸² *See, e.g.*, Guillaume (@city19akro), TWITTER (Mar. 18, 2018, 5:04 AM), <https://twitter.com/city19akro/status/975342278146428928?lang=en> [<https://perma.cc/7EEH-JSJJ>] (“There's an interesting story about how @CypheriumChain (a project where @Disruptpreneur & @el33th4xor are advisors to) got funds from their private sale hacked and they're hiding it from solicited investors. Eth ended up here 0x94f20ccff70d82d1579d8b11f2985f8de9b287cf.”).

⁸³ *See* Jeff John Roberts, *Inside Uncle Sam's Secret Bitcoin Hoard*, FORTUNE (Feb. 21, 2018), <http://fortune.com/2018/02/21/government-forfeiture-bitcoin-auction/> [<https://perma.cc/F747-AUDL>] (discussing how criminals sometimes use third-party services to make it difficult or impossible to trace bitcoin transactions).

⁸⁴ *Cf.* Eric Brousseau, *Property Rights in the Digital Space*, in THE ELGAR COMPANION TO THE ECONOMICS OF PROPERTY RIGHTS 438, 448 (Enrico Colombatto, ed., 2004) (describing the difficulty in enforcing intangible property rights in the digital age).

⁸⁵ *See, e.g.*, Angela Morris, *Judge Orders \$30 Million in Bitcoin to Be Returned in Cryptocurrency Class Action*, MIAMI DAILY BUS. REV. (Aug. 3, 2017), <https://advance.lexis.com/api/permalink/e067ba8f-6e83-4192-a430-dcc793182938/?context=1000516> [<https://perma.cc/Z3FD-2PA5>] (Plaintiffs secured a judgment against an embezzler who stole bitcoin, but they are unlikely to recover from the defendant who fled to China.).

Leaving true owners without any effective remedy for wrongful dispossession of cryptocurrency is unsatisfactory. Such an outcome would incentivize crypto-theft and discourage wide adoption of cryptocurrencies.

C. Protecting First-in-Time Interests Over Free-Flowing Transactions

The general principle of property law is to protect the earlier possessor—the true owner—against wrongful dispossession.⁸⁶ This principle creates tension between owners and good-faith purchasers who have a possessory interest in property. Mere possession is sometimes insufficient to justify unfettered ownership when the earlier owner was dispossessed without their consent. The law produces different outcomes because the bona fide acquisition rule applies to some types of property but not others. Understanding the reasoning for this differing legal treatment of personal property or secured interests in intangible goods illustrates why applying the same rules to cryptocurrencies produces an unsatisfactory result.

1. *Personal Property, Goods, and the Bona Fide Acquisition Rule*

Legal systems protecting the rights of first-in-time owners against innocent purchasers do so within restrictions bound in both practice and policy. When dealing with personal—as opposed to real—property, legal treatment of the property depends on the property’s characteristics: tangibility (books versus contract rights), fungibility (artwork versus the hardware used to hang it), and consumability (a hamburger versus a car).⁸⁷ These factors affect how strongly a legal system will protect true owners over innocent possessors; they create a loose taxonomy of property types.⁸⁸ However,

[T]hese taxonomies are neither precise nor strict and their variety is staggering if one describes a multiplicity of legal systems. It is important to consider at our level of abstraction that different things may fit in a variety of taxonomies. The use of such taxonomies is justified by the need to handle with precision, to accommodate, and to submit to common rules objects whose nature may be different but whose legal regime for certain purposes should be the same. For example, a brand new car is a

⁸⁶ See BRUCE ZIFF, *PRINCIPLES OF PROPERTY LAW* 433 (4th ed. 2006).

⁸⁷ MATTEL, *supra* note 43, at 87.

⁸⁸ See *id.*

fungible, nonconsumable, tangible good. A pound of bread is a fungible, consumable, tangible good.⁸⁹

While tangibility and fungibility are discussed herein, consumability is not relevant to a discussion relating to property rules and bitcoin. Bitcoin is not consumed but merely exchanged.

Tangibility argues for a recognition of good-faith possessory interests free from prior ownership interests because physical possession is widely recognized as a reliable indicator of ownership; innocent purchasers are justified in relying on possession in such circumstances and should be protected.⁹⁰ This is not a hard and fast rule. Under UCC § 2-403, an innocent purchaser may not acquire good title to stolen tangible goods unless the purchaser acquired the goods in the ordinary course of business from a merchant who deals in goods of that kind and to whom the stolen goods were entrusted.⁹¹ Property that is intangible is necessarily harder to physically “possess” but is instead controlled by excluding others.⁹²

Laws that evolved around controlling physical property are not well-suited to intangible property.⁹³ In particular, the presumption that possession indicates ownership⁹⁴ is not as strong when dealing with control of intangibles, where control may be non-exclusive.⁹⁵ Therefore, systems of control of intangibles tend to be governed by their own rules, such as the laws governing intellectual property or the laws of contract controlling the transfer of contract rights.⁹⁶ These systems are grounded in property law principles, which have been adapted to the means of control of the intangibles in question.⁹⁷

Fungibility favors good-faith possessory interests. A possessor of a fungible item will have the stronger claim to it because it is generally impractical to distinguish one specific fungible item from another.⁹⁸

⁸⁹ *Id.*

⁹⁰ *See id.* at 107.

⁹¹ U.C.C. § 2-403 (AM. LAW INST. & UNIF. LAW COMM'N 2013); *see also* U.C.C. § 2-105 (AM. LAW INST. & UNIF. LAW COMM'N 2013) (defining goods).

⁹² *See* MATTEI, *supra* note 43, at 69.

⁹³ *See id.* at 69–70.

⁹⁴ *Id.* at 107.

⁹⁵ *See generally* Fairfield, *supra* note 53, at 864–65 (employing the term “rivalrousness” as a “measure of exclusivity of possession” and discussing how physicality as a measure of possession has been inadequately analogized by courts to intangible digital property).

⁹⁶ MATTEI, *supra* note 43, at 70. *See generally* Fairfield, *supra* note 53, at 865–68 (discussing how the law of intellectual property has intruded on and hampered the development of digital property law).

⁹⁷ *See* MATTEI, *supra* note 43, at 70.

⁹⁸ *See* Reid, *supra* note 40, at 570 (quoting JAMES DALRYMPLE STAIR, *THE INSTITUTIONS*

However, if fungible property is identifiable in some way, then that may allow assertion of an earlier ownership interest over a later possessor. For example, coins are fungible. But coins in a sealed sack, with an unbroken seal indicating they are the same coins that were lost, are discernable.⁹⁹

Regardless of the above taxonomic divisions, certain property with peculiar ownership recording systems favors first-in-time owners against innocent purchasers who acquire stolen property.¹⁰⁰ Here, first-in-time owners are favored because property tracked by recording systems is accepted by society as sufficiently valuable or important to protect ownership interests over even innocent possessors.¹⁰¹ A public recording system for certain property also serves a notice function to purchasers, who bear responsibility for checking the title of property prior to purchasing. For these special types of property interests, we accept the burden of title searches as necessary to protect the valuable or important associated interests. Property with a recording system tends to be high-value and not frequently exchanged. For example, vehicles and secured interests in certain property have a specific system of recording interests, paralleling the recording systems used for real property.¹⁰²

For personal property and goods, the presumption is to protect earlier-in-time ownership interests.¹⁰³ However, there are circumstances that may defeat that presumption and allow innocent purchasers to acquire good title to property.¹⁰⁴ Whether the bona fide acquisition rule applies to non-consumable personal property depends on the property's tangibility, fungibility, and the existence of a title registry. No one factor is dispositive. The determination distills into two inquiries, applied below: (1) whether the purchaser was justified in relying on the seller's apparent control of the property as evidence of undisputed ownership and (2) whether the property is discernable and thus provably the property of another.

OF THE LAW OF SCOTLAND 2.1.34 (D.M. Walker ed., 2d ed. 1693)).

⁹⁹ See Reid, *supra* note 40, at 571.

¹⁰⁰ See MATTEI, *supra* note 43, at 68, 87–88 (emphasizing, however, that it is the danger represented by vehicles and the need to attach liability that justifies vehicles' recording system).

¹⁰¹ See *id.*

¹⁰² See *id.* at 88.

¹⁰³ See ZIFF, *supra* note 86, at 433.

¹⁰⁴ See Fairfield, *supra* note 53, at 860 (“Error clearing rules also abound in the law of property. For example, rules of many different stripes protecting the rights of bona fide purchasers and buyers in the ordinary course of business clear accumulated clouds on title.”).

2. *Treating Cryptocurrency as Traceable Personal Property*

There appears to be little agreement as to what property classification is appropriate for cryptocurrency.¹⁰⁵ For the purposes of the bona fide acquisition rule, a better approach is to consider whether cryptocurrency property characteristics support application of the rule to this novel sort of digital property.¹⁰⁶

Cryptocurrency has some peculiar characteristics that distinguish it from traditional notions of personal property. Whereas only one owner may physically possess tangible property, several people may share a private key controlling some amount of bitcoin.¹⁰⁷ A private key may be printed out on a piece of paper. Thus, it is tangible and able to be physically held, but this does not restrict others from controlling the associated bitcoin if they know the private key.¹⁰⁸ The bona fide acquisition rule depends on possession or control as a reliable indicator that the possessor is entitled to exercise ownership rights over property. If possession or control is not necessarily exclusive, then it is unreasonable to presume rightful ownership of the property merely because a person has control.

More importantly, cryptocurrencies are inextricably bound up in their own public recording system. Cryptocurrencies rely on the blockchain's public ledger of transaction histories for their very existence. This is because the amount of bitcoin associated with a bitcoin address is really the sum total of all bitcoin transactions relating to that address.¹⁰⁹ Take our earlier wallet example. A person could pick up anyone's wallet, count the real-world cash, and know how much cash value they possessed. They can spend that cash ignorant of any prior transactions. But if a person were to come across the private key of a bitcoin address—thereby picking up another's cryptocurrency “wallet”—that wallet only contains a reference to the ledger of all of that address's transactions contained on the blockchain. A share of a cryptocurrency has relative value and utility inseparable from the blockchain, and the blockchain is a publicly viewable ledger of all transactions on which that cryptocurrency relies. This vast

¹⁰⁵ Compare Lorena Yashira Gely-Rojas, *Cryptocurrencies and the Uniform Commercial Code: The Curious Case of Bitcoin*, 8 U. PUERTO RICO BUS. L.J. 129, 138 (2017) (bitcoin is intangible personal property for purposes of the UCC), with Raskin, *supra* note 36, at 987–88 (2015) (bitcoin is tangible personal property for the purposes of jurisdiction).

¹⁰⁶ See Fairfield, *supra* note 53, at 863–64 (arguing that digital property should “dispense with physicality (or conversely, intangibility) as the characteristic used to sort asset categories” and replace it with a more functional approach).

¹⁰⁷ Raskin, *supra* note 36, at 994.

¹⁰⁸ *Id.* at 990–91.

¹⁰⁹ See discussion, *supra* Section II.

amount of transactional information is presented in an abstract form to users, but is required nonetheless.

If a complete knowledge of all transactions is required to use cryptocurrencies, then knowing that transaction history adds no costs to bitcoin transactions. Theoretically, this appears to completely undermine the justification for the bona fide application rule to cryptocurrencies. There are no transaction costs adding friction to commerce, and there is perfect knowledge of prior transactions: the best of both worlds. We can allow first-in-time owners to assert claims against later third parties because no purchaser would ever be acquiring cryptocurrency without knowledge of prior bad transactions.

This would be true, but for the fact that current blockchain variations maintain only basic transaction information. Current cryptocurrencies do not distinguish between “good” and “bad” transactions.¹¹⁰ On the blockchain, the aforementioned hacks of Mt. Gox (which resulted in almost a million stolen bitcoin) look the same as any other transaction.¹¹¹ This information limitation places an unfair burden on innocent purchasers, who have no simple method for determining whether a contemplated bitcoin purchase involves stolen property or any other adverse claims.

3. *Secured Interests in General Intangibles and the Bona Fide Acquisition Rule*

A special category of property interests bears mentioning: secured interests in general intangibles under Article 9 of the UCC. The general intangible category is a catchall for personal property not included in other definitions under Article 9.¹¹² The category includes intellectual property, software, and payment intangibles—rights to payment not included in other Article 9 categories.¹¹³ A secured, perfected interest in a general intangible is created when a debtor presents the intangible as collateral for

¹¹⁰ See Kaminska, *supra* note 81 (“Bitcoin’s public ledger records a transfer of digital access rights in the eyes of the clearing network. It does not, however, record or see the terms and conditions of that transfer. Indeed, as far as the clearing network is concerned all it knows is that a transfer has occurred.”).

¹¹¹ Some third-party websites have recently begun flagging cryptocurrency addresses involved in crypto-theft based on user-generated reports. See, e.g., *Address 0xaA923Cd02364Bb8A4c3d6F894178d2e12231655C*, ETHERSCAN, <https://etherscan.io/address/0xaa923cd02364bb8a4c3d6f894178d2e12231655c> [<https://perma.cc/SL6S-6LMN>] (flagging this address with text on a red background stating, “[w]arning! This address is involved in Cryptopia’s hack.”). This information is limited to users of that particular website and is not embedded in the blockchain itself.

¹¹² U.C.C. § 9-102 cmt. 5.d (AM. LAW INST. & UNIF. LAW COMM’N 2013).

¹¹³ U.C.C. § 9-102(42) & cmt. 5.d (AM. LAW INST. & UNIF. LAW COMM’N 2013).

a debt and the creditor has properly recorded their interest in it.¹¹⁴ Once perfected, a security interest in a general intangible persists through transfers of the property, even to bona fide purchasers for value without notice.¹¹⁵ This is different from the UCC's treatment of a security interest in money, which applies the bona fide acquisition rule to protect innocent purchasers.¹¹⁶

4. Secured Interests in Cryptocurrency

The text of the UCC appears to bring secured interests in cryptocurrencies within the scope of Article 9.¹¹⁷ Article 9's catchall "general intangibles" category includes cryptocurrencies, which do not meet the UCC's definition of money or any other UCC property category.¹¹⁸ Furthermore, "Article 9 applies to secured transactions, regardless of the form of the transaction. No matter how the parties characterize their transaction, if the substance is a secured transaction in personal property, UCC Article 9 applies."¹¹⁹

Security interests in general intangibles survive "even after multiple transfers to third parties."¹²⁰ This presents a significant problem for buyers of cryptocurrencies because there will always be a risk that a bitcoin has been subjected to a perfected security interest by a creditor.¹²¹ Current versions of cryptocurrencies have no mechanism for knowing when a bitcoin has a lien or other earlier adverse claims.¹²² Consequently, a good faith innocent purchaser of bitcoin has no way to prevent the risk

¹¹⁴ See Schroeder, *supra* note 56, at 29–30.

¹¹⁵ *Id.* at 30 ("Article 9 has no negotiation rule for the buyers of general intangibles that are subject to a perfected security interest. That is, once a security interest in a general intangible is perfected, it survives even after multiple transfers to third parties.").

¹¹⁶ See Louis F. Del Duca, *The Commercial Law of Bitcoin and Blockchain Transactions*, 47 UCC L.J., 1, 8 (2017) ("Article 9 protects innocent transferees of money from an account (a rule intended to facilitate commerce, because otherwise anyone receiving payment might have to first do due diligence on the bank account, which would put considerable friction into commercial transactions).").

¹¹⁷ Schroeder, *supra* note 56, at 10.

¹¹⁸ *Id.* ("[A]lthough bitcoin proponents would like it to function as currency, it does not and cannot be made to fit within the U.C.C.'s narrow definition of money. By process of elimination, it falls within the catchall category of 'general intangibles.'").

¹¹⁹ Del Duca, *supra* note 116 (citing U.C.C. § 9-109(a) (AM. LAW INST. & UNIF. LAW COMM'N 2013)).

¹²⁰ Schroeder, *supra* note 56, at 30.

¹²¹ Bob Lawless, *Is UCC Article 9 the Achilles Heel of Bitcoin?*, CREDIT SLIPS (Mar. 10, 2014), <https://www.creditslips.org/creditslips/2014/03/is-ucc-article-9-the-achilles-heel-of-bitcoin.html> [<https://perma.cc/H57R-K82W>].

¹²² See Kaminska, *supra* note 81.

of creditors pursuing claims against them.¹²³ And creditors could continue to follow the bitcoin collateral's transaction trail indefinitely because secured interests in bitcoin persist through multiple transactions—all recorded on the blockchain.¹²⁴ The inability of an intended transferee to effectively perform due diligence on a cryptocurrency transaction hampers the liquidity of these virtual currencies and will slow their adoption for commercial use.¹²⁵

This is unsatisfactory and unworkable if bitcoin is ever to be widely adopted because it will undoubtedly be used (and is likely currently used) as collateral for debts.¹²⁶ Conveyance rules that favor earlier-in-time owners, relative to later purchasers, place the obligation on those purchasers to inquire as to the title of property. *Caveat emptor* applies even where there is no formal recording system to indicate clean title. But if the earlier ownership interest is never extinguished, under any circumstance, then there must be *some* mechanism for purchasers to perform a title inquiry. At the time of writing this article, no major cryptocurrency provides such a mechanism,¹²⁷ putting good-faith purchasers—indeed, any purchasers—in an unfairly precarious position regarding acquired bitcoin.

IV. CRYPTOCURRENCIES' UNFULFILLED POTENTIAL

In the United States, the law confusingly treats cryptocurrencies based on the context of their use.

[T]he bitcoin asset itself can be simultaneously classified four separate ways:

¹²³ Del Duca, *supra* note 116 (“[A]nyone that takes bitcoin may have the risk that the bitcoin is someone's collateral, meaning its possible that the bitcoin will be traced and returned to the creditor.”); Schroeder, *supra* note 56, at 30.

¹²⁴ See Kaminska, *supra* note 81 (“[U]nder the United States’ UCC code (uniform commercial code) as long as bitcoins are treated as general intangibles, no high value investor can be sure that an angry Tony Soprano won’t show up one day to claim that the bitcoins they thought they received in a completely unencumbered manner are actually his.”).

¹²⁵ See *id.* (suggesting legislative changes to reduce the friction in commercial bitcoin transactions).

¹²⁶ See Lawless, *supra* note 121 (“Up until now, bitcoins have not become a substantial part of mainstream commerce such that the Article 9 problem may have been of little consequence, but if bitcoins are to become part of mainstream commerce, the Article 9 problem must be solved.”); see also Schroeder, *supra* note 56, at 30.

¹²⁷ Kaminska, *supra* note 81 (“Bitcoin’s public ledger records a transfer of digital access rights in the eyes of the clearing network. It does not, however, record or see the terms and conditions of that transfer.”).

1. “Currency” or “Convertible Portable Currency” as classified by guidance issued by the Financial Crimes Enforcement Network (FinCEN) for the purposes of their regulatory structure and the Bank Secrecy Act (BSA);
2. “Security” by guidance from the SEC;
3. “Commodity” by the US Commodity Futures Trading Commission (CFTC); and
4. “Property” by the Internal Revenue Service (IRS).¹²⁸

The above classifications are driven by regulators seeking authority over cryptocurrencies within their different spheres of control. Courts have not yet considered the applicability of the bona fide acquisition rule to cryptocurrencies. If courts were to do so, they would likely reach one of three conclusions: (1) cryptocurrencies should be treated like money, and innocent purchasers acquire it free of any prior claims; (2) cryptocurrencies are traceable personal property, and earlier-in-time owners may assert claims against good-faith purchasers; or (3) a creditor has a secured interest in the cryptocurrency at issue, and UCC Article 9 allows the creditor’s claims against innocent purchasers.¹²⁹

Whether we apply the bona fide acquisition rule to cryptocurrency or not produces an unsatisfactory result for someone: either the first-in-time owners who suffer from crypto-theft or innocent purchasers who acquire in good faith with no notice of wrongdoing. This stems from trying to fit the square peg of *digital* property into the round hole of a rule designed to address competing interests in *physical* property.

What makes cryptocurrencies unique is that they are more than just digital property; they are the framework for a complete digital property system. They are a means of storing and exchanging value, paying for goods, and tracking transactions. Bitcoin was created to eliminate intermediaries from transactions and allow owners complete control over their assets.¹³⁰ But the creators of these new digital property systems did not appreciate that they were creating the perfect target and vehicle for theft: valuable, compact, and portable.¹³¹ Owners of cryptocurrencies must

¹²⁸ Gina (Scialabba) Jurva, *Regulation of Financial Services Conference: Is Bitcoin a Currency, a Security, or a Commodity? It’s Complicated*, LEGAL EXEC. INST. (June 7, 2018), <http://www.legalexecutiveinstitute.com/regulation-financial-services-understanding-bitcoin/> [https://perma.cc/9YBW-6QQN].

¹²⁹ See Schroeder, *supra* note 56, at 30.

¹³⁰ See Nakamoto, *supra* note 23, at 1.

¹³¹ See generally Nathaniel Popper, *As Bitcoin Bubble Loses Air, Frauds and Flaws Rise to Surface*, N.Y. TIMES (Feb. 5, 2018),

take extensive precautions to avoid crypto-theft because stolen cryptocurrency is virtually impossible to recover. These security measures, and the investigation and litigation arising from crypto-theft, add substantial costs to a system that was designed to be as frictionless as possible.¹³²

Cryptocurrency's strength is its backbone: the blockchain. This public ledger can maintain more information about transactions than cryptocurrencies do currently; it represents unfulfilled potential. Cryptocurrencies could (and should) have built-in mechanisms for flagging transactions subject to liens or adverse claims, including a flag for stolen cryptocurrency. Information costs for due diligence could be negligible; imagine an immediate warning prior to a transaction that the cryptocurrency you are purchasing is secured as collateral or the product of crypto-theft. Cryptocurrencies would need to address how to properly file an interest on assets, how to resolve competing interests, and how to clean title to property. These are problems suited to a programmatic approach, and cryptocurrencies are programs at their core. The title registry and notice rules for real property or security interests could serve as inspiration for systemic improvements, but the blockchain has the potential to be more responsive to problems with digital title and give users active actual notice of transactional irregularities as compared to conventional registry systems.

Cryptocurrencies were designed as a means of digital property ownership free from interference by third-party authorities. Making cryptocurrencies a more fully fleshed-out property system by adding to the functionality of the blockchain would further the private-law goals of these new digital property frameworks. But until cryptocurrencies make better use of the blockchain to avoid and resolve competing claims arising from wrongful transfers, users will continue to pursue satisfaction in sovereign legal systems. Reducing the need for interventional dispute resolution by courts or regulators will result in a more efficient and fair system and work to keep cryptocurrencies free from unnecessary external controls.

<https://www.nytimes.com/2018/02/05/technology/virtual-currency-regulation.html>
[<https://perma.cc/RT3V-PKQ3>].

¹³² See Nakamoto, *supra* note 23, at 1 (stating that one objective of Bitcoin was reducing transaction costs of a system reliant on trusted intermediaries).