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Crypto-Collateral

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Crypto-Collateral

*Kevin V. Tu**

ABSTRACT

The use of cryptocurrency has permeated new industries. As it does so, the need to confront the broader commercial law implications of cryptocurrency, particularly the applicability of the Uniform Commercial Code (U.C.C.), becomes more pronounced. For example, creditors and debtors increasingly use cryptocurrency as collateral. But Article 9 of the U.C.C. does not expressly mention cryptocurrency. Fortunately, Article 9 is flexible enough to accommodate the collateralization of cryptocurrency within its currently defined collateral types. The foregoing, notwithstanding Article 9, could be amended to improve the functionality of Article 9 for those to engage in secured transactions with crypto-collateral. Rather than build upon the existing literature on how to optimize Article 9 collateral, this article examines the broader question of whether Article 9 should be amended to better accommodate crypto-collateral. This article suggests that the decision to amend Article 9 involves more than simply determining the most appropriate framework for enforcing security interests in crypto-collateral. Other considerations include: (1) the challenge of enacting a uniform amendment; (2) the uncertain future of cryptocurrency; and (3) the impact of further normalizing the use of cryptocurrency. Accordingly, this article does not seek to definitively answer the question of whether or how to amend Article 9 for cryptocurrency. Instead, it endeavors to deepen the conversation by examining some of the considerations at play so that informed decisions can be made by policymakers.

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I. INTRODUCTION

Cryptocurrency has carved out a place in commercial transactions—initially as a method of payment for goods¹ and more recently as collateral for secured obligations.² In fact, a new industry of crypto-secured loan providers has even emerged.³ These loan providers specifically target the owners of cryptocurrency with a simple proposition—leverage the value of your cryptocurrency without having to sell it.⁴ Although far from ubiquitous, the growing prevalence of cryptocurrency in commercial transactions highlights the importance of examining its broader commercial law implications.

1. See Kevin V. Tu & Michael Meredith, *Rethinking Virtual Currency Regulation in the Bitcoin Age*, 90 WASH. L. REV. 271, 286–91 (2015); see also Jerry Brito & Andrea Castillo, *Bitcoin: A Primer for Policymakers*, MERCATUS CTR. 14–19 (2016), https://www.mercatus.org/system/files/gmu_bitcoin_042516_webv3_0.pdf; Brian Patrick Eha, *More Major Retailers Are Getting Ready to Accept Bitcoin*, ENTREPRENEUR (Jan. 29, 2014), <http://www.entrepreneur.com/article/231134>.
2. See Kevin V. Tu, *Perfecting Bitcoin*, 52 GA. L. REV. 505, 539–44 (2018); see also Pamela J. Martinson & Christopher P. Masterson, *The Hazards of Lending to Bitcoin Users*, AM. BANKER (Jan. 2, 2014, 12:00 PM), <https://www.americanbanker.com/opinion/the-hazards-of-lending-to-bitcoin-users> (“Owned Bitcoin has the potential to be collateral for loans, but creditors are likely more concerned with restricting Bitcoin acquisition or use by borrowers due to the uncertain regulatory landscape, irreversible nature of payments, extreme volatility of value and anonymity of the system.”); Jonathan W. Riley, *Heads I Win, Tails You Lose? Bitcoin as Collateral is Not a Good Bet*, LENDING L. REPORT (Jan. 14, 2014), <https://www.lendinglawreport.com/2014/01/articles/collateral/heads-i-win-tails-you-lose-bitcoin-as-collateral-is-not-a-good-bet/> (discussing the pros and cons of accepting Bitcoin as collateral); Wallace Young, *What Community Bankers Should Know About Virtual Currencies*, COMMUNITY BANKING CONNECTIONS (2015), <https://cbcfors.org/articles/2015/q2/virtual-currencies> (discussing the posting of virtual currency as collateral for a loan).
3. See Vincent Ryan, *Lenders Now Taking Bitcoin as Collateral*, CFO (Jan. 4, 2018), <http://ww2.cfo.com/credit/2018/01/lenders-now-taking-bitcoin-collateral/>; Jon Southurst, *Huobi Will Now Take Your Bitcoins as Stock Trading Collateral*, COINDESK (May 5, 2015, 11:54 PM), <https://www.coindesk.com/huobi-will-now-take-your-bitcoins-as-stock-trading-collateral/>; Will Yakowicz, *Bitcoin Millionaires Have a New Way to Cash Out Without Ever Selling a Single Bitcoin*, INC. (Feb. 15, 2018), <https://www.inc.com/will-yakowicz/loan-startups-accept-cryptocurrency-collateral.html>; *Abic Corporation Offers Crypto-Secured Loans*, COINWIRE (June 5, 2018), <https://www.coinwire.com/abic-corporation-offers-cryptocurrency-secured-loans>; *Unchained Capital Announces Crypto-Secured Loans are Now Available to the Public*, BUSINESS WIRE (Nov. 30, 2017), <https://www.businesswire.com/news/home/20171130005323/en/Unchained-Capital-Announces-Crypto-Secured-Loans-Public>.
4. See *supra* note 3.

Commercial law, however, has largely ignored cryptocurrency.⁵ Uniform Commercial Code (U.C.C.) Article 9 does not expressly recognize cryptocurrency.⁶ As a result, a degree of uncertainty exists about how cryptocurrency fits into the existing provisions of Article 9.⁷ The legal uncertainty has not deterred the practice of collateralizing cryptocurrency.⁸ But it has prompted discussion about issues of practical import.⁹ Do the existing provisions of Article 9 permit the use of cryptocurrency?¹⁰ If so, how does one obtain a valid and enforceable security interest in crypto-collateral? How can the process of collateralizing cryptocurrency be improved? The author builds upon this foundation in this article.

The author starts with a core premise—Article 9 provides a means of creating and enforcing security interests in cryptocurrency.¹¹ But Article 9’s legal framework is far from perfect.¹² As such, it is capable of improvement.¹³ That is, Article 9 could be optimized for the unique attributes of crypto-collateral.¹⁴ But the question of whether to amend Article 9 for crypto-collateral is more complicated. It involves more than simply reaching consensus on the best way to accommodate crypto-collateral under Article 9. Accordingly, this article’s primary contribution is the identification and examination of additional considerations relevant to the decision, including: (1) the challenges of developing and enacting a uniform amendment to Article 9; (2) the uncertain future of cryptocurrency; and (3) whether the continued growth of mainstream cryptocurrency use remains advisable.

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5. See Tu, *supra* note 2, at 513–15, 545.
 6. See U.C.C. § 9-102 (AM. LAW INST. & NAT’L CONFERENCE OF COMM’R ON UNIF. STATE LAWS 2010); see also Tu, *supra* note 2, at 513.
 7. See Craig Barnett, *Cyber-Lending: Perfecting Security Interests in the New Frontier of Cryptocurrency Backed Loans*, BLOCKCHAIN MAG. (July 11, 2018), <https://blockchainmagazine.net/cyber-lending-perfecting-security-interests-in-the-new-frontier-of-cryptocurrency-backed-loans/>; Ryan M. Behrman, *How Do You Perfect and Enforce a Security Interest in Virtual Currencies?*, 25-3 CLARK’S BANK DEPOSITS & PAYMENTS MONTHLY (Mar. 2016); George K. Fogg, *The UCC and Bitcoins: Solution to Existing Fatal Flaw*, 104 BBR 741 (Apr. 14, 2015); Bob Lawless, *Is UCC Article 9 the Achilles Heel of Bitcoin?*, CREDIT SLIPS (Mar. 10, 2014, 8:17 PM), <http://www.creditslips.org/creditslips/2014/03/is-ucc-article-9-the-achilles-heel-of-bitcoin.html>; Tu, *supra* note 2, at 546–50.
 8. See *supra* notes 2–3.
 9. See *supra* note 7.
 10. See *supra* note 7; see also Ronald Mann, *Reliable Perfection of Security Interests in Crypto-Currency*, SMU SCI. & TECH. L. REV. (forthcoming 2019).
 11. See Mann, *supra* note 10; Tu, *supra* note 2, at 516.
 12. See Mann, *supra* note 10; Tu, *supra* note 2, at 516.
 13. See Fogg, *supra* note 7; Tu, *supra* note 2, at 557–78.
 14. See Fogg, *supra* note 7; Tu, *supra* note 2, at 557–78.

Part II begins by examining the use of cryptocurrency as collateral in secured transactions, including the reasons that cryptocurrency is valuable as collateral. Part III summarizes how cryptocurrency fits into the existing provisions of U.C.C. Article 9. Part IV looks to the future of crypto-collateral under Article 9 and contends that informed deliberations about amending Article 9 require a more expansive perspective, because cryptocurrency implicates issues beyond the U.C.C.

II. THE GROWTH OF CRYPTO-COLLATERAL

The practice of secured lending (or asset-based lending) is hardly new. Borrowers have long pledged assets as security for a repayment obligation, granting lenders the right to foreclose upon the pledged asset in the event of a default. What is a relatively new phenomenon, however, is the use of cryptocurrency as collateral. Instead of securing loans with more traditional assets such as inventory,¹⁵ accounts receivable,¹⁶ and equipment,¹⁷ some lenders and borrowers are now turning to cryptocurrencies such as Bitcoin and Ethereum.¹⁸

Part II briefly examines the use of cryptocurrency collateral, focusing first on the question of why a lender or borrower would want to use cryptocurrency as collateral before describing some of the ways that a security interest in cryptocurrency might arise.

A. Why Crypto-Collateral?

Collateral serves a vital role in a lending transaction. For the lender, collateral mitigates the risk of default by the buyer. It acts as a secondary source of repayment if the buyer fails to pay. Collateral, therefore, can provide a borrower with access to credit/financing. Collateral can serve as an inducement to lenders who would otherwise decide against lending to a borrower.

But why crypto-collateral? Of all the different assets that a given borrower may possess, why grant (or take) a security interest in a borrower's cryptocurrency? In short, for both lenders and borrowers, cryptocurrency is viable as collateral (either alone or as part of a broader collateral package) because of access and value.

1. Access to Crypto-Collateral

By access, the author means that cryptocurrency is increasingly common. Though far from ubiquitous, a growing number of individuals and firms hold cryptocurrency. Its reach, both as an alternative method of payment and

15. U.C.C. § 9-102(a)(48).

16. *Id.* § 9-102(a)(2).

17. *Id.* § 9-102(a)(33).

18. *See supra* notes 2–3.

as means of speculative investment, has grown.¹⁹ It is no surprise that daily cryptocurrency transaction volume has grown steadily since 2009 and remains relatively strong in 2018.²⁰ As such, potential borrowers are now more likely to possess or hold cryptocurrency, making it a more readily available form of collateral. This is evidenced by the growing number of users of cryptocurrency,²¹ the proliferation of new types of cryptocurrency,²² and the increased mainstream acceptance of and investment in cryptocurrency.²³

In March 2017, a study by Dr. Garrick Hileman and Michel Rauchs at the University of Cambridge Judge Business School estimated that unique active users of cryptocurrencies wallets numbered between 2.9 million and 5.8 million.²⁴ That number is growing, with some major cryptocurrency exchanges adding more than 1,000 users per day.²⁵ In January 2018, the number of Bitcoin users alone had grown to between 13 million and 28.5 million

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19. See Tu & Meredith, *supra* note 1, at 284–93; see also *Initial Coin Offerings (ICOs)*, U.S. SEC. & EXCH. COMM’N (Aug. 28, 2018), <https://www.sec.gov/ICO> (noting that “[c]ompanies and individuals are increasingly considering initial coin offerings (ICOs) as a way to raise capital or participate in investment opportunities.”).
 20. See *Bitcoin, Litecoin, Dogecoin Transactions Historical Chart*, BITINFO-CHARTS, <https://bitinfocharts.com/comparison/transactions-btc-ltc-doge.html> (last visited Feb. 5, 2019) (showing historical transactions per day for several different cryptocurrencies).
 21. See generally Dr. Garrick Hileman & Michel Rauchs, *Global Cryptocurrency Benchmarking Study*, UNIV. CAMBRIDGE (2017), <https://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/global-cryptocurrency/#.W6CUOS3MzVq>.
 22. See COINMARKETCAP, <https://coinmarketcap.com/all/views/all/> (last visited Feb. 5, 2019) (listing over 2,000 different cryptocurrencies).
 23. See, e.g., Chance Barnett, *Inside the Meteoric Rise of ICOs*, FORBES (Sept. 23, 2017), <https://www.forbes.com/sites/chancebarnett/2017/09/23/inside-the-meteoric-rise-of-icos/#31458efd5670>; Sally Davies & Thomas Hale, *Bitcoin Company Coinbase Lands 75M Investment from NYSE and BBVA*, FIN. TIMES (Jan. 20, 2015), <https://www.ft.com/content/b6f63e4c-a0af-11e4-9aee-00144feab7de>; Shawn Knight, *Dell Joins the Growing List of Major Retailers Now Accepting Bitcoins*, TECHSPOT (July 18, 2014), <https://www.techspot.com/news/57461-dell-joins-the-growinglist-of-major-retailers-now-accepting-bitcoin.html>.
 24. Hileman & Rauchs, *supra* note 21.
 25. Joseph Young, *Exponential Growth: Cryptocurrency Exchanges Are Adding 100,000+ Users Per Day*, COINTELEGRAPH (Jan. 7, 2018), <https://cointelegraph.com/news/exponential-growth-cryptocurrency-exchanges-are-adding-100000-users-per-day>.

users.²⁶ Some analysts have even predicted that the total number of cryptocurrency users will exceed 200 million by 2024.²⁷

The number of cryptocurrencies, like the number of users, has also grown. Cryptocurrency is no longer just about Bitcoin. By some accounts, over 2,000 different cryptocurrencies now exist.²⁸ Of these cryptocurrencies, twenty-three have a market cap of over at least \$1 billion.²⁹

Finally, cryptocurrency is becoming more mainstream. Cryptocurrency is now accepted as a form of payment by many well-known merchants, including Dell,³⁰ Expedia,³¹ Overstock.com,³² and Microsoft.³³ Even the Sacramento Kings basketball team will accept bitcoin for tickets, jerseys, and concessions.³⁴ Cryptocurrency, therefore, is increasingly accepted for both online and brick-and-mortar purchases.³⁵ In addition, cryptocurrency is viewed by some as ripe for speculative investment.³⁶ Despite the risk, the

26. Alex Lielacher, *How Many People Use Bitcoin? Updated for 2018*, BITCOIN MARKET J. (July 31, 2018), <https://www.bitcoinmarketjournal.com/how-many-people-use-bitcoin/>.
27. Joseph Young, *Exponential Growth: Number of Bitcoin Users to Reach 200 Million by 2024*, CCN (Dec. 9, 2017), <https://www.ccn.com/exponential-growth-number-bitcoin-users-reach-200-million-2024/>.
28. See COINMARKETCAP, *supra* note 22.
29. COINMARKETCAP, *supra* note 22.
30. See Sydney Temper, *Dell Begins Accepting Bitcoin*, N.Y. TIMES (July 18, 2014), <https://dealbook.nytimes.com/2014/07/18/dell-begins-accepting-bitcoin/>.
31. See Jane Genova, *Expedia Accepts Bitcoin—Why?*, PAYMENTWEEK (June 18, 2014), <https://paymentweek.com/2014-6-18-expedia-accepts-bitcoin-why-4923/>; Knight, *supra* note 23.
32. See Cade Metz, *Overstock.com Becomes First Major Retailer to Accept Bitcoin Worldwide*, WIRED (Sept. 11, 2014), <https://www.wired.com/2014/09/overstock-com-becomes-first-major-retailer-accept-bitcoin-worldwide/>.
33. See Aaron Smith, *Microsoft Begins Accepting Bitcoin*, CNN (Dec. 11, 2014), <https://money.cnn.com/2014/12/11/technology/microsoft-bitcoin/index.html>.
34. See Michael J. Casey, *Sacramento Kings to Accept Bitcoin*, WALL ST. J. (Jan. 16, 2014), <https://www.wsj.com/articles/sacramento-nba-team-to-accept-bitcoin-1389884367?tesla=y>.
35. See Tu & Meredith, *supra* note 1, at 285–91.
36. See Tu & Meredith, *supra* note 1, at 292–93; see also Ellen Chang, *Is Bitcoin a Safe Investment?*, U.S. NEWS & WORLD REPORT (May 4, 2018), <https://money.usnews.com/investing/cryptocurrency/articles/2018-05-04/is-bitcoin-a-safe-investment>; Ruth Umoh, *19-year-old Bitcoin Millionaire: Here's How Much You Should Invest in Cryptocurrencies*, CNBC (Feb. 2, 2018), <https://www.cnbc.com/2018/02/02/bitcoin-millionaire-says-this-is-how-much-to-invest-in-cryptocurrency.html>; *Seven Questions to Ask Before Investing in Cryptocurrency*, FORBES (Mar. 30, 2018), <https://www.forbes.com/sites/>

potential for significant returns has attracted investors.³⁷ Cryptocurrency investing, however, has expanded beyond attempts to simply buy low and sell high. Investors can now participate in investment opportunities known as “initial coin offerings” (ICOs), a means of raising capital from interested investors in exchange for “tokens” issued on a blockchain.³⁸ According to Coindesk, ICOs have raised \$6.3 billion in the first quarter of 2018 (approximately 118% of the over \$5 billion raised by ICOs in all of 2017).³⁹

To be clear, the foregoing description of cryptocurrency’s rise is not offered as an endorsement. Instead, it serves a very limited purpose: to highlight that cryptocurrency is no longer a novelty or mere curiosity. As such, in the context of secured transactions, lenders are much more likely to encounter a borrower with cryptocurrency assets. Lenders who are seeking assets to secure a lending obligation increasingly find borrowers (both individuals and business entities) willing to pledge their cryptocurrency as collateral. The prevalence of cryptocurrency as an asset makes cryptocurrency potentially useful as collateral.

2. Value of Crypto-Collateral

As collateral, cryptocurrency is also useful because of its value. For example, in December 2017, Bitcoin reached a high of nearly 20,000 U.S. dollars for a single bitcoin.⁴⁰ Even after dropping in value, Bitcoin’s market

forbesfinancecouncil/2018/03/30/seven-questions-to-ask-before-investing-in-cryptocurrency/#31324e049d0a.

37. See *supra* note 36.

38. See Izabella Kaminska & Paul Murphy, *Bitcoin’s Surge Fuels Fears of Asset Bubble*, FIN. TIMES (May 14, 2017), <https://www.ft.com/content/ce3ef54e-371b-11e7-bce4-9023f8c0fd2e>; Richard Kastelein, *What Initial Coin Offerings Are, and Why VC Firms Care*, HARVARD BUS. REV. (Mar. 24, 2017), <https://hbr.org/2017/03/what-initial-coin-offerings-are-and-why-vc-firms-care>; Alex Wilhelm, *WTF is an ICO?*, TECHCRUNCH (2017), <https://techcrunch.com/2017/05/23/wtf-is-an-ico/>; *The Market in Initial Coin Offerings Risks Becoming a Bubble*, ECONOMIST (Apr. 27, 2017), <https://www.economist.com/finance-and-economics/2017/04/27/the-market-in-initial-coin-offerings-risks-becoming-a-bubble>.

39. David Floyd, *\$6.3 Billion: 2018 ICO Funding Has Passed 2017’s Total*, COINDESK (Apr. 19, 2018), <https://www.coindesk.com/6-3-billion-2018-ico-funding-already-outpaced-2017/>.

40. See *Bitcoin (USD) Price*, COINDESK, <https://www.coindesk.com/price/> (last visited Feb. 5, 2019); see also Stan Higgins, *From \$900 to \$20,000: Bitcoin’s Historic 2017 Price Run Revisited*, COINDESK (Dec. 30, 2017 13:30 UTC), <https://www.coindesk.com/900-20000-bitcoins-historic-2017-price-run-revisited/>.

capitalization still stands at over \$128 billion, and a single bitcoin trades at over \$7,000.⁴¹

Bitcoin value, of course, is not necessarily indicative of the value of all other cryptocurrencies. In fact, most cryptocurrency values pale in comparison to Bitcoin's per coin price and market capitalization.⁴² Even so, cryptocurrencies other than Bitcoin remain valuable. In May 2018, the market capitalization of twenty-three different cryptocurrencies exceeded \$1 billion.⁴³ 129 cryptocurrencies had a market capitalization of over \$100 million, and more than 475 cryptocurrencies had a market capitalization of over \$10 million.⁴⁴

Because collateral serves as a secondary source of repayment when a borrower defaults,⁴⁵ the value of collateral is paramount. But collateral of any kind most effectively mitigates the risk of default if the value of the collateral exceeds the amount of the secured obligation at the time of default.⁴⁶ As such, lenders typically seek to over-collateralize.⁴⁷ By requiring over-collateralization for financing, the lender mitigates the risk of diminished collateral value—for example, if the collateral depreciates in value, is damaged or destroyed, or is transferred in violation of a security agreement.⁴⁸ Thus, the lender lowers its exposure to risk of default.⁴⁹

Cryptocurrency, therefore, provides lenders with a means of adding collateral value. Lenders may seek a pledge of cryptocurrency assets as all or part of the collateral for a secured loan. As such, one can view cryptocurrency as another asset for purposes of credit enhancement. Absent a pledge of cryptocurrency, a borrower may lack assets of sufficient value to obtain a loan. Even if the borrower has other assets of value, lenders may very well seek to add a pledge of cryptocurrency to further mitigate the risk of de-

41. See *Bitcoin (USD) Price*, *supra* note 40 (listing the price of Bitcoin as of May 28, 2018); *Top 100 Cryptocurrencies by Market Capitalization*, COINMARKETCAP, <https://coinmarketcap.com/> (last visited Feb. 5, 2019) (listing the market capitalization of Bitcoin on May 28, 2018).

42. See *Top 100 Cryptocurrencies*, *supra* note 41 (For example, Ethereum—the second most valuable cryptocurrency—traded at \$567.89 and had a market capitalization of over \$55 billion on May 28, 2018).

43. See *Top 100 Cryptocurrencies*, *supra* note 41.

44. See *Top 100 Cryptocurrencies*, *supra* note 41.

45. See U.C.C. § 9-610 (giving secured creditors the right to sell or otherwise dispose of collateral following default); see also *id.* § 9-615 (providing for the application of sale proceeds to satisfy the obligation secured by the collateral).

46. See *supra* note 45.

47. See *Overcollateralization—OC*, INVESTOPEDIA, <https://www.investopedia.com/terms/o/overcollateralization.asp> (last visited Feb. 5, 2019).

48. *Id.*

49. *Id.*

fault.⁵⁰ In that regard, the value of cryptocurrency collateral may facilitate the extension of credit.

It is also worth noting that the ability to quickly and efficiently convert the value of cryptocurrency into cash may add to its attractiveness as collateral. Although many cryptocurrencies are not exchange-traded, cryptocurrency exchanges (like Bitpanda, Bitstamp, Coinbase, and Kraken) facilitate the purchase and sale of some of the most popular cryptocurrencies.⁵¹ Because of this, the value of listed cryptocurrencies (such as Bitcoin, Ethereum, Litecoin, and Ripple) can be converted to cash.⁵² Therefore, lenders may benefit from the existence of a market for selling some types of crypto-collateral after a default. Despite liquidity problems,⁵³ the presence of established cryptocurrency exchanges may make it easier and less costly for lenders to locate interested buyers. In addition, cryptocurrencies (unlike other types of collateral, like equipment) do not need to be prepared or maintained by the lender in advance of a sale, which also reduces the costs of holding an Article 9 sale.⁵⁴

In short, cryptocurrencies may constitute a viable piece of collateral in secured lending transactions because cryptocurrencies are increasingly common. In addition, they are valuable assets that, in many cases, can be easily converted into cash by a lender upon default. Because of these attributes, lenders may seek cryptocurrency as collateral from borrowers who possess it. In turn, borrowers with cryptocurrency hold an asset that is valuable and potentially useful as collateral in an effort to obtain financing from a lender.

50. See Tu, *supra* note 2, at 556–57.

51. See Cherry Reynard, *Is it Better to Buy or Trade Cryptocurrencies*, TELEGRAPH (May 25, 2018), <https://www.telegraph.co.uk/technology/digital-money/buying-vs-trading-cryptocurrency/>; Yoav Vilner, *Cryptocurrency Exchanges are Getting Better in User Experience and Liquidity*, FORBES (July 14, 2018), <https://www.forbes.com/sites/yoavvilner/2018/07/14/cryptocurrency-exchanges-are-getting-better-in-user-experience-and-liquidity/#7da42ee037f3>; Joseph Young, *Volumes on Most Major Cryptocurrency Exchanges are Fake or Inflated*, COINTELEGRAPH (Mar. 20, 2018), <https://cointelegraph.com/news/volumes-on-most-major-cryptocurrency-exchanges-are-fake-or-inflated-study>; *Liquidity Problems – One of the Biggest in Current Cryptocurrency Exchanges*, MEDIUM (June 26, 2018), <https://medium.com/@enbofficial/liquidity-problems-one-of-the-biggest-in-current-cryptocurrency-exchanges-b5aeaa4446a6>; *Mechanisms for Creating Liquidity on the Cryptocurrency Markets*, MEDIUM (Jan. 22, 2018), <https://medium.com/@evenfoundation/mechanisms-for-creating-liquidity-on-the-cryptocurrency-markets-6f67550c8649>.

52. See, e.g., BITPANDA, <https://www.bitpanda.com/en> (last visited Feb. 5, 2019); BITSTAMP, <https://www.bitstamp.net/> (last visited Feb. 5, 2019); COINBASE, <https://www.coinbase.com/> (last visited Feb. 5, 2019); KRAKEN, <https://www.kraken.com/> (last visited Feb. 5, 2019).

53. See *supra* note 51.

54. See Tu & Meredith, *supra* note 1, at 282–83.

3. Challenges of Crypto-Collateral

Despite the attributes that make it useful as collateral, cryptocurrency admittedly presents lenders with challenges and risks. The most significant of these challenges center on the effect of price volatility and the risk of loss, which may reduce the value of a lender's collateral. Accordingly, lenders may need to take steps to mitigate the risks associated with declining collateral value when crypto-collateral is involved.

The price of cryptocurrency is notoriously volatile. In fact, Bitcoin's brief history is peppered with major crashes and recoveries.⁵⁵ On more than one occasion, Bitcoin's value has dropped by over thirty percent.⁵⁶ In April 2013, the value of Bitcoin dropped an astounding seventy-one percent overnight.⁵⁷ More recently, the value of a single Bitcoin rose from around \$1,000 in January 2017 to nearly \$20,000 in December 2017.⁵⁸ The price of a single bitcoin has since dropped to \$7,418.99 on May 29, 2018.⁵⁹

An in-depth examination of the reasons for each major price shock is beyond the scope of this Article. However, the decline in value is often attributed to the market's reaction to external events such as government crackdowns,⁶⁰ major hacks or outages at exchanges,⁶¹ and sell-offs of large quantities of cryptocurrency.⁶² Regardless of the reasons, price volatility is a reality of cryptocurrency, and it has a direct impact on the use of cryptocurrency as collateral in secured lending transactions.

In an ideal secured loan, the lender never resorts to repossession and sale of the collateral. Rather, the borrower abides by the terms of the loan

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55. See, e.g., Timothy B. Lee, *An Illustrated History of Bitcoin Crashes*, FORBES (Apr. 11, 2013), <https://www.forbes.com/sites/timothylee/2013/04/11/an-illustrated-history-of-bitcoin-crashes/#11e9890b4039>; Jeff John Roberts, *5 Big Bitcoin Crashes: What We Learned*, FORTUNE (Sept. 18, 2017), <http://fortune.com/2017/09/18/bitcoin-crash-history/>.
 56. See Roberts, *supra* note 55.
 57. Roberts, *supra* note 55.
 58. *Bitcoin (USD) Price*, *supra* note 40; see also Tu, *supra* note 2, at 516.
 59. *Bitcoin (USD) Price*, *supra* note 40.
 60. See Roberts, *supra* note 55 (attributing a price drop in the summer of 2017 to China's crackdown on initial coin offerings and rumors of a government ban on cryptocurrency trading).
 61. Roberts, *supra* note 55 (attributing a seventy-one percent overnight price drop to an outage at Mt. Gox—the largest exchange for buying and selling bitcoin at the time).
 62. See Joseph Young, *Bitcoin Drops to \$8,300 as Mt. Gox Trustee Sell Off Continues*, Market Drops, CCN (Mar. 9, 2018), <https://www.ccn.com/bitcoin-drops-8300-mt-gox-trustee-sell-off-continues-market-drops/> (attributing a \$2,300 drop in Bitcoin's price over a 48-hour period to the sale of 40,000 bitcoins by the Mt. Gox Trustee).

and repays the entirety of the secured obligation. However, if a default occurs, the lender may have no alternative other than repossession and sale of collateral.⁶³ If the proceeds of the sale exceed the outstanding obligation, then all is well. The lender applies the sale proceeds to satisfy the secured obligation.⁶⁴ But if the proceeds of the sale are insufficient then the lender may not be repaid in full.⁶⁵

Crypto-collateral, therefore, poses a challenge. The value of cryptocurrency is neither stable nor predictable. Unlike assets that have a steady depreciation rate, crypto-collateral may quickly lose value. On the other hand, lenders may benefit to the extent that crypto-collateral increases in value. To be fair, the challenge of price volatility is not unique to crypto-collateral. Other types of collateral, like stocks and commodities, also suffer from price fluctuations.⁶⁶ Nevertheless, mitigating the risk of a decrease in crypto-collateral value is important for lenders who opt to take a security interest in cryptocurrency. Lenders may need to account for the potential of a price decrease in assessing collateral value at the onset of a secured loan involving cryptocurrency. For example, lenders may mitigate some of the risk by over-collateralizing and requiring other types of collateral instead of relying solely on crypto-collateral. Lenders who do so may be better positioned in the event of a decrease in the price of cryptocurrency.

Beyond price volatility, crypto-collateral presents challenges related to the risk of unauthorized transfer, theft, and loss. Again, these issues are not unique to crypto-collateral. All types of collateral are susceptible to unauthorized transfer, theft, and loss. However, attributes of cryptocurrency may heighten the risk.⁶⁷ Cryptocurrency transactions are described as both irreversible⁶⁸ and pseudonymous.⁶⁹ In the context of collateral, these attributes may impede or prevent repossession and sale by the lender. Consider, for example, cryptocurrency that is stolen or lost to hackers or cryptocurrency that is transferred by the borrower in violation of the terms of the security agreement. Since the transaction is irreversible, the person who is now in control of the cryptocurrency—the hackers or transferee—would need to ini-

63. See U.C.C. §§ 9-609, 9-610(a).

64. See *id.* § 9-615(a).

65. See *id.* § 9-615(d).

66. See, e.g., *Loan Stock*, INVESTOPEDIA, https://www.investopedia.com/terms/l/loan_stock.asp (last visited Feb. 5, 2019).

67. See Martinson & Masterson, *supra* note 2; see also Tu, *supra* note 2, at 544, 557.

68. See *Some Things You Need to Know*, BITCOIN.ORG, <https://bitcoin.org/en/you-need-to-know> (last visited Feb. 5, 2019) (“Any transaction issued with Bitcoin cannot be reversed, they can only be refunded by the person receiving the funds.”).

69. See Brito & Castillo, *supra* note 1, at 10–12.

tiate a new transaction to return the cryptocurrency.⁷⁰ In addition, the pseudonymous nature of cryptocurrency transactions means that personally identifiable information, such as the name of the transferee, is not associated with the transaction.⁷¹ This makes it more difficult and costly for lenders to identify the person now in possession of the crypto-collateral.⁷²

Because of these attributes, lenders may seek to mitigate the risk by taking additional steps when crypto-collateral is involved. For example, lenders could take affirmative steps to prevent the borrower from transferring crypto-collateral. Instead of relying solely upon contractual prohibitions against transfer, lenders could require that the borrower transfer crypto-collateral to a wallet controlled by the lender.⁷³ Doing so would prevent the borrower from using or transferring crypto-collateral without the lender's knowledge and agreement. In addition, lenders may resort to overcollateralization and require collateral other than cryptocurrency.⁷⁴ Doing so may provide lenders with sufficient collateral in the event of theft, loss, or unauthorized transfer of crypto-collateral.

Ultimately, the risks and challenges of cryptocurrency do not appear to render it useless as collateral. Though the characteristics of crypto-collateral may present heightened concerns about lost collateral value, lenders can take steps to mitigate the risk. Therefore, the value of cryptocurrency can be, and is, used to provide additional security in lending transactions.

B. Examples of Cryptocurrency Collateralization

Having concluded that cryptocurrency is potentially viable as collateral, Part II.B highlights how cryptocurrency collateral is used in secured lending today. The use of crypto-collateral, therefore, is neither a fantasy nor a prediction for the future. Rather, it is already a reality of secured lending both in the United States and abroad.

The most obvious example is a lender that affirmatively seeks a pledge of cryptocurrency from a potential borrower. Given the value of cryptocurrency and the lenders own risk-tolerance, some lenders may agree to provide a loan to borrowers that pledges cryptocurrency as all or part of the collateral for the obligation to repay. Major financial institutions have yet to uniformly

70. See *Some Things You Need to Know*, *supra* note 68.

71. See Tu & Meredith, *supra* note 1, at 291; see also Brito & Castillo, *supra* note 1, at 10–12.

72. See Tu, *supra* note 2, at 556; see also Brito & Castillo, *supra* note 1, at 10–12 (discussing methods of deanonymization); *Bitcoin Transactions Aren't as Anonymous as Everyone Hoped*, MIT TECH. REV. (Aug. 23, 2017), <https://www.technologyreview.com/s/608716/bitcoin-transactions-arent-as-anonymous-as-everyone-hoped/> (discussing means of linking Bitcoin transactions to individuals).

73. See Tu, *supra* note 2, at 556; see also Mann *supra* note 10.

74. See Tu, *supra* note 2, at 557.

accept cryptocurrency as collateral.⁷⁵ However, interest in crypto-collateral lending is growing among others, including a group of startups in the business of originating loans secured by cryptocurrency.⁷⁶

But even if a lender is not actively seeking to obtain a security interest in a borrower's cryptocurrency, there are still many instances in which crypto-collateral will be implicated. Consider the following examples. First, lenders commonly seek to obtain an "all assets" security interest that covers all of the borrower's personal property.⁷⁷ As a result, an "all assets" security interest granted by any borrower who holds cryptocurrency will necessarily involve crypto-collateral. Second, lenders frequently obtain a security interest that covers after-acquired property.⁷⁸ Third, Article 9 of the U.C.C. provides that a security interest in original collateral also includes a security interest over any identifiable proceeds.⁷⁹ So, if a borrower sells or trades any original collateral for cryptocurrency, then the cryptocurrency is proceeds,⁸⁰ and the lender's security interest includes crypto-collateral.⁸¹

Finally, the growth of cryptocurrency has given rise to a group of new startups with a business model based entirely on the offering "crypto-se-

75. See Evelyn Cheng, *Major Wall Street Analyst: Here's What Needs to Happen for the Bitcoin Boom to Keep Going*, CNBC (July 24, 2017), <https://www.cnbc.com/2017/07/24/this-needs-to-happen-to-keep-bitcoin-boom-going-bank-of-america.html>.

76. See, e.g., M. Sandra Appel, *Can You Take a Security Interest in Bitcoin*, DLA PIPER PUBL'NS (May 7, 2014), <https://www.dlapiper.com/en/canada/insights/publications/2014/05/can-you-take-a-security-interest-in-bitcoin>; Olaga Kharif, *These Guys Want to Lend You Money Against Your Bitcoin*, BLOOMBERG (Dec. 13, 2017), <https://www.bloomberg.com/news/articles/2017-12-14/bitcoin-s-new-barons-no-longer-have-to-sell-to-live-in-luxury> (discussing SALT Lending, Nebeus, CoinLoan, and EthLend); Martinson & Masterson, *supra* note 2; Riley, *supra* note 2; Ryan, *supra* note 3 (discussing Unchained Capital); Southurst, *supra* note 3; Young, *supra* note 2.

77. See, e.g., Barbara M. Goodstein, *Collateral Descriptions and Blanket Liens: Is the Kitchen Sink Enough?*, N.Y.L.J. (June 4, 2015), <https://www.law.com/newyorklawjournal/almID/1202728248480/?slreturn=20180818154052> ("Blanket or 'all assets' security interests are among the most common, if not the most common, type of lien required of borrowers by secured lenders in commercial transactions.").

78. See U.C.C. § 9-204(a).

79. See *id.* §§ 9-102(a)(64), 9-315(a)(2).

80. *Id.*

81. Imagine, for example, a bike shop that grants a security interest in all bike inventory to a bank. The bike shop sells the bike inventory—bikes, helmets, and the like—to its customers. The bike shop accepts traditional payment methods but also decides to accept Bitcoin. The bank's security interest covers the bike inventory as original collateral, but it also covers the payments received by the bike shop, including the Bitcoin, as proceeds.

cured” loans to borrowers.⁸² These startups differ from traditional secured creditors who seek to fit crypto-collateral into their existing secured lending practices. In contrast, these startups seek to provide enhanced liquidity to holders of cryptocurrency assets by allowing owners to access the value of their cryptocurrency without selling it.⁸³ Unchained Capital (an Austin, Texas based start-up) lends up to \$1 million to individuals and businesses who provide either Bitcoin or Ethereum as collateral.⁸⁴ Unchained Capital, however, is not alone in providing these types of loans.⁸⁵ Denver-based SALT Lending is another.⁸⁶ SALT Lending provides liquidity to cryptocurrency holders by offering cash loans in exchange for a pledge of cryptocurrency or other blockchain assets.⁸⁷ A different model for offering “crypto-secured” loans is provided by Biterest, which provides a peer-to-peer platform for borrowing and lending money secured with Bitcoin.⁸⁸ Startups in other countries, including Japan and China, also offer crypto-secured loans.⁸⁹

The foregoing accentuates the growing prevalence of crypto-collateral in secured lending transactions both in the United States and abroad. Crypto-collateral is a present reality for those engaging in secured transactions. Lenders and borrowers, therefore, must be attuned to the potential of cryptocurrency serving as a form of credit enhancement in secured loans. Moreover, those engaged in secured lending transactions must be aware of the distinct ways that crypto-collateral may affect a secured lending transaction, including the legal requirements for obtaining and maintaining an enforceable security interest in crypto-collateral.

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82. See Kharif, *supra* note 76; Xuan-Thao Nguyen, *Lessons From Case Study of Secured Transactions with Bitcoin*, 21 SMU SCI. & TECH. L. REV. (forthcoming 2019); Ryan, *supra* note 3; Yackowicz, *supra* note 3; *Unchained Capital Announces Crypto-Secured Loans are Now Available to the Public*, *supra* note 3.
83. See *supra* note 82.
84. See *supra* note 82.
85. See *supra* note 82.
86. See Jonathan Shieber, *SALT Lending Offers Liquidity for Cryptocurrency Holders*, TECHCRUNCH (May 2, 2018), <https://techcrunch.com/2018/05/02/salt-lending-offers-liquidity-for-cryptocurrency-holders/>; SALT Lending, <https://www.saltlending.com/> (last visited Feb. 5, 2019).
87. See *supra* note 86.
88. BITEREST, <https://biterest.com/en/borrower> (last visited Feb. 5, 2019).
89. See Kevin Helms, *Japanese Corporation Begins Offering Loans Secured by Cryptocurrency*, BITCOIN.COM, <https://news.bitcoin.com/japanese-corporation-loans-secured-cryptocurrency/> (last visited Feb. 5, 2019); Southurst, *supra* note 3.

III. A PRIMER ON CRYPTO-COLLATERAL UNDER ARTICLE 9

Given the growth of crypto-collateral, a general understanding of the relevant legal framework for obtaining enforceable security interests in cryptocurrency is necessary. To date, the basic consensus is that the existing provisions of U.C.C. Article 9, while imperfect, can accommodate the use of crypto-collateral.⁹⁰ However, Article 9 does not recognize crypto-collateral as a separate and distinct collateral type.⁹¹ Article 9 is flexible enough to govern the practice by treating crypto-collateral within its currently defined collateral type—most likely as a “general intangible.”⁹² Thus, all of the rules for obtaining, maintaining, and enforcing a security interest in general intangibles can be applied to crypto-collateral.⁹³

A. Cryptocurrency as General Intangibles

Under Article 9 of the U.C.C., general intangibles exist as a broad catch-all collateral type.⁹⁴ If the collateral is personal property, and it does not fall into one of the other collateral types defined by Article 9, then it is a general intangible.⁹⁵ Other U.C.C. collateral types, such as “money”⁹⁶ and

90. See Timothy Bierer, *Hashing it Out: Problems and Solutions Concerning Cryptocurrency Used as Article 9 Collateral*, 7 CASE W. RES. J.L. TECH. & INTERNET 79 (2016); Reno F.R. Fernandez III, *Can Bitcoin be Used as Collateral to Secure a Loan?*, BAR ASS’N S.F. (June 30, 2014), <https://blog.sfbar.org/2014/06/30/can-bitcoin-be-used-as-collateral-to-secure-a-loan/>; Fogg, *supra* note 7; Mann, *supra* note 10; Lance P. Martin, *Can I Secure a Loan with Bitcoin? Part I*, NAT’L L. REV., 2018 WLNR 8331794 (Mar. 18, 2018); Jeanne Schroeder, *Bitcoin and the Uniform Commercial Code*, 24 U. MIA. BUS. L. REV. 1, 8 (2016); Jeffrey I. Snyder, *Secured Lender Protection Limited When Bitcoin is Collateral*, NAT’L L. REV. (2014), WLNR 16714205 (June 19, 2014); Tu, *supra* note 2, at 557; Carl N. Wedoff, *When Blockchain Meets Article 9 and Bankruptcy*, LEXOLOGY (Feb. 9, 2018), <https://www.lexology.com/library/detail.aspx?g=b0bdad9f-eccd-4a7e-9491-b14d33af7c09>; see also Appel, *supra* note 76 (discussing security interests in cryptocurrency under Canadian law).

91. See U.C.C. § 1-201; see also *id.* § 9-102.

92. See *id.* § 9-102(a)(42); see also Tu, *supra* note 2, at 546–47; Fogg, *supra* note 7; Schroeder, *supra* note 90, at 8.

93. See Tu, *supra* note 2, at 554.

94. See U.C.C. §§ 9-102(a)(42), 9-102 cmt. 5.d (“‘General intangible’ is the residual category of personal property, including things in action, that is not included in the other defined types of collateral.”); Tu, *supra* note 2, at 547.

95. See *supra* note 94.

96. U.C.C. § 1-201(b)(24) (defining “money” as a medium of exchange currently authorized or adopted by a domestic or foreign).

“investment property”⁹⁷ may seem potentially applicable to cryptocurrency. After all, cryptocurrency is used for paying for goods and services as well as for speculative investment.⁹⁸ But neither the definition of “money” nor the definition of “investment property” appears to fit cryptocurrency.

Cryptocurrency does not qualify as “money” under the U.C.C. for two primary reasons. First, cryptocurrency is not tangible.⁹⁹ It is entirely digital and, therefore, lacks a physical form.¹⁰⁰ In contrast, the U.C.C. treats “money” as a moveable good that is capable of possession by a secured party.¹⁰¹ In fact, the only way to perfect a security interest in money is via possession by the secured party.¹⁰² Categorizing cryptocurrency as “money” for purposes of the U.C.C., therefore, is inappropriate because it is intangible.¹⁰³ Second, the definition of money is limited to a “medium of exchange currently authorized or adopted by a domestic or foreign government.”¹⁰⁴ A number of foreign governments have started development of a state-backed cryptocurrency or digital currency.¹⁰⁵ Some have even launched a government-backed cryptocurrency.¹⁰⁶ Venezuela’s Petro, for example, is backed by

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97. *Id.* § 9-102(a)(49) (defining “investment property” as “a security, whether certificated or uncertificated, security entitlement, securities account, commodity contract, or commodity account”).
98. See Nikolei M. Kaplanov, *Nerdy Money: Bitcoin, the Private Digital Currency, and the Case Against its Regulation*, 25 LOY. CONSUMER L. REV. 111, 127–28 (2012); James Surowiecki, *Cryptocurrency: The Bitcoin, a Virtual Medium of Exchange, Could Be a Real Alternative to Government-Issued Money—But Only If It Survives Hoarding by Speculators*, MIT TECH. REV. (Aug. 23, 2011), <https://www.technologyreview.com/s/425142/cryptocurrency/>.
99. See Schroeder, *supra* note 90, at 11; Tu & Meredith, *supra* note 1, at 277; Brito & Castillo, *supra* note 1, at 7.
100. See *supra* note 99.
101. See U.C.C. §§ 9-312(b)(3), 9-313(a).
102. See *id.* § 9-313(a).
103. See Schroeder, *supra* note 90, at 19–20.
104. U.C.C. § 1-201(b)(24).
105. See, e.g., Qin Chen, *Next Stop in Cryptocurrency Craze: A Government-Backed Coin*, CNBC (Nov. 30, 2017), <https://www.cnbc.com/2017/11/30/cryptocurrency-craze-springboards-government-backed-coin.html>; Mike Orcutt, *Governments Are Testing Their Own Cryptocurrencies*, MIT TECH. REV. (Sept. 25, 2017), <https://www.technologyreview.com/s/608910/governments-are-testing-their-own-cryptocurrencies/>; David Tweed, *Why Governments Might Join the Cryptocurrency Craze*, BLOOMBERG (Feb. 12, 2018), <https://www.bloomberg.com/news/articles/2018-02-12/why-governments-might-join-the-cryptocurrency-craze-quicktake>.
106. Roger Aitken, *Does Venezuela’s Oil-Backed ‘Petro’ Have the Power to Showcase National Cryptocurrencies?*, FORBES (May 31, 2018), <https://www.forbes.com/sites/rogeraitken/2018/05/31/does-venezuelas-oil-backed-petro-have-the->

a barrel of crude oil.¹⁰⁷ Most cryptocurrencies, however, are not authorized or adopted by a government.¹⁰⁸ As a result, a government-backed cryptocurrency, like the Venezuelan Petro, could ostensibly qualify as a government-authorized or -approved medium of exchange. But many cryptocurrencies, including popular ones like Bitcoin, would not fit the existing U.C.C. definition of money because they are not money.¹⁰⁹

Cryptocurrency also fails to fit neatly within the category of “investment property,” which the U.C.C. defines as “a security, whether certificated or uncertificated, security entitlement, securities account, commodity contract, or commodity account.”¹¹⁰ Because Article 9 does not define the term “security,” the federal securities laws are useful in considering what qualifies as such. The definition of “security” is virtually identical in both the 1933 and 1934 Acts.¹¹¹ Unless the context requires otherwise, the term “security” means:

any note, stock, treasury stock, security future, security-based swap, bond, debenture, certificate of interest or participation in any profit-sharing agreement or in any oil, gas or other mineral royalty or lease, any collateral-trust certificate, preorganization certificate or subscription, transferable share, investment contract, voting-trust certificate, certificate or deposit for a security, any put, call, straddle, option, or privilege or any security, certificate

power-to-showcase-national-cryptocurrencies/#4c24a05f7b43; Rachelle Krygier, *Venezuela Launches the ‘Petro,’ its Cryptocurrency*, WASH. POST (Feb. 20 2018), https://www.washingtonpost.com/news/worldviews/wp/2018/02/20/venezuela-launches-the-petro-its-cryptocurrency/?noredirect=on&utm_term=.4586138d6250; Corina Pons & Girsih Gupta, *The Petro, Venezuela’s Oil-Backed Cryptocurrency, Raised \$735 Million, Government Says*, BUS. INSIDER (Feb. 21, 2018), <https://www.businessinsider.com/r-venezuela-says-launch-of-petro-cryptocurrency-raised-735-million-2018-2>.

107. See Brito & Castillo, *supra* note 1, at 6 (noting that the value of cryptocurrency is not derived from gold or a government).

108. See Lawless, *supra* note 7; Schroeder, *supra* note 90, at 19–20; Tu, *supra* note 2, at 547–48; *but see* Jake Adelstein & Sam Namezie, *Is Bitcoin Legal Tender in Japan?*, SEEKING ALPHA (Dec. 24, 2017), <https://seekingalpha.com/article/4133681-bitcoin-legal-tender-japan> (discussing claims that Japan’s Virtual Currency Act gives bitcoin legal tender status); *ADVISORY—References to Bitcoin as ‘Legal Tender’ in Japan*, REUTERS (Dec. 13, 2017), <https://uk.reuters.com/article/idUKL3N1OD35L> (confirming that references to bitcoin as legal tender in several Reuters stories were incorrect and clarifying that bitcoin can be used as a legally accepted form of payment).

109. See *supra* note 103.

110. U.C.C. § 9-102(a)(49).

111. ROBERT H. ROSENBLUM, INVESTMENT COMPANY DETERMINATION UNDER THE 1940 ACT: EXEMPTIONS AND EXCEPTIONS 29–30 (Am. Bar Ass’n ed., 2d ed. 2003).

of deposit, or group or index of securities (including any interest therein or based on the value thereof), or any put, call, straddle, option, or privilege entered into on a national securities exchange relating to foreign currency, or in general, any instrument commonly known as a “security”; or any certificate of interest or participation in, temporary or interim certificate for, receipt for, or warrant or right to subscribe to or purchase, any of the foregoing; but shall not include currency or any note, draft, bill of exchange, or banker’s acceptance which has a maturity at the time of issuance not exceeding nine months, exclusive of days of grace, or any renewal thereof the maturity of which is likewise limited.¹¹²

The Supreme Court has described the definition as “quite broad.”¹¹³ Further, in considering scope, the Supreme Court stated that the definition was intended to include “the many types of instruments that in our commercial world fall within the ordinary concept of a security.”¹¹⁴ As a result, the definition includes “ordinary stocks and bonds, along with the ‘countless and variable schemes devised by those who seek the use of money of others on the promise of profits . . .’”¹¹⁵

Although cryptocurrency itself is not a stock or bond, certain cryptocurrency transactions could be characterized as a scheme devised by those who seek to use the money of others on the promise of profits. As such, some cryptocurrency uses may fall within the broadly inclusive definition of a security, likely as an “investment contract” under the *Howey* test.¹¹⁶ However, it appears unlikely that cryptocurrency would constitute a security in all cases.

Consider the following transactions involving cryptocurrency: (1) a person who obtains cryptocurrency by mining; (2) a person who sells valuable goods or services in exchange for cryptocurrency; (3) a person who purchases cryptocurrency from an exchange to use it as a method of payment; (4) a person who purchases cryptocurrency from an exchange to hold and trade it as an investment; (5) a person who invests in an ICO. Each of the foregoing highlights a different type of cryptocurrency transaction with distinct methods of distribution and objectives. Some of these transactions, for example those that plainly involve the investment of money and profit seek-

112. 15 U.S.C. § 78c(a)(10) (West 2010); *see also id.* § 77b(a)(1) (defining the term “security” for purposes of the Securities Act of 1933).

113. *Marine Bank v. Weaver*, 455 U.S. 551, 556 (1982).

114. *Id.* at 555–56.

115. *Id.* at 556.

116. *U.S. Sec. & Exch. Comm’n v. W.J. Howey Co.*, 328 U.S. 293, 298–99 (1946) (establishing that an investment contract is “a contract, transaction or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the efforts of the promoter or a third party.”).

ing, appear more likely to meet the definition of a security. However, the other transactions do not appear to fit the same mold. It seems, then, that cryptocurrency can constitute a security under certain circumstances, but it is not always a security.

The Securities and Exchange Commission's (SEC) view of cryptocurrency lends credence to the conclusion above. The SEC has expressly acknowledged that "there are cryptocurrencies that do not appear to be securities."¹¹⁷ More recently, SEC officials have stated they do not view Bitcoin and Ethereum as securities.¹¹⁸ As such, they should not be regulated as securities.¹¹⁹ However, ICOs almost always constitute securities.¹²⁰ In the SEC's view, then, the question of whether a cryptocurrency is a security will depend on its characteristics and use.¹²¹

The implication for the categorization of cryptocurrency under Article 9 is relatively clear. Investment property as a collateral type does not appear to fully encompass cryptocurrency. Investment property is limited, by definition, to securities and the like.¹²² Notwithstanding the broad concept of "securities" under federal securities law, only some applications of cryptocurrency, namely, ICOs, will constitute a security. As a result, the Article 9 collateral category of "investment property" may not be applicable to cryptocurrency held by a potential borrower.

Cryptocurrency, therefore, does not appear to fit fully into the existing U.C.C. collateral types such as "money" and "investment property."¹²³ In fact, cryptocurrency does not appear to fall within any of the other separately defined collateral types except "general intangibles."¹²⁴ Article 9 basically

117. Chairman Jay Clayton, *Statement on Cryptocurrencies and Initial Coin Offerings*, U.S. SEC. & EXCH. COMM'N (Dec. 11, 2017); *see also* U.S. SEC. & EXCH. COMM'N, *Statement on Potentially Unlawful Online Platforms for Trading Digital Assets* (Mar. 7, 2018) [hereinafter *SEC Statement*] (noting that online platforms for trading digital assets, including coins, must register with the SEC if the digital assets are securities).

118. Louise Matsakis, *Rest Easy Cryptocurrency Fans: Ether and Bitcoin Aren't Securities*, WIRED (June 14, 2018), <https://www.wired.com/story/sec-ether-bitcoin-not-securities/>.

119. *See id.*

120. *See id.*; *see also* Stan Higgins, *SEC Chief Clayton: 'Every ICO I've Seen is a Security'*, COINDESK (Feb. 16, 2018), <https://www.coindesk.com/sec-chief-clayton-every-ico-ive-seen-security/>.

121. *See* ROSENBLUM, *supra* note 111.

122. U.C.C. § 9-102(a)(49).

123. *See* Tu, *supra* note 2, at 547–50; *but see* Bierer, *supra* note 90, at 88–94 (suggesting that cryptocurrency could arguably fit into existing concepts of money, securities, and investment property).

124. *See* Fogg, *supra* note 7; Schroeder, *supra* note 90, at 30; Tu, *supra* note 2, at 546–47.

defines “general intangibles” as a catch all or residual category of collateral.¹²⁵ The definition includes any intangible personal property other than one of the separately listed Article 9 collateral types.¹²⁶ Accordingly, the U.C.C. is flexible enough to accommodate crypto-collateral by treating it as a “general intangible” under the existing provisions of Article 9.¹²⁷

B. Enforceable Security Interests Under Article 9

As discussed above, crypto-collateral does not currently exist as a separate and distinct collateral type under the U.C.C.¹²⁸ Instead, Article 9 is flexible enough to accommodate the practice of collateralizing cryptocurrency within currently defined collateral types, most likely by treating it as a “general intangible.”¹²⁹ Accordingly, all of the rules that apply to the attachment, perfection, priority, and enforcement of security interests in “general intangibles,” would govern security interests in crypto-collateral.¹³⁰ Moreover, as noted by those who have examined the issue, Article 9’s treatment of crypto-collateral as a “general intangible” has significant implications for how to obtain and enforce a security interest under Article 9.¹³¹

For purposes of attaching an enforceable security interest in crypto-collateral, a secured lender must comply with the requirements of section 9-203.¹³² If crypto-collateral is treated as a “general intangible,” a lender only obtains an enforceable security interest if: (1) the lender gives value to the borrower; (2) the borrower has rights in the crypto-collateral; and (3) borrower has authenticated a security agreement that describes the collateral.¹³³ Section 9-203 provides alternatives to the third requirement.¹³⁴ For certain types of collateral, a lender may establish possession or control of the collateral in lieu of obtaining an authenticated security agreement that describes

125. See Fogg, *supra* note 7; Schroeder, *supra* note 90, at 30; Tu, *supra* note 2, at 546–47.

126. U.C.C. § 9-102(a)(42).

127. See Fogg, *supra* note 7; Schroeder, *supra* note 90, at 30; Tu, *supra* note 2, at 546–47.

128. See U.C.C. §§ 1-201, 9-102.

129. See Fogg, *supra* note 7; Schroeder, *supra* note 90, at 30; Tu, *supra* note 2, at 546–47.

130. See Fogg, *supra* note 7; Schroeder, *supra* note 90, at 30; Tu, *supra* note 2, at 546–47.

131. See Fogg, *supra* note 7; Schroeder, *supra* note 90, at 30; Tu, *supra* note 2, at 546–47.

132. U.C.C. § 9-203.

133. *Id.* § 9-203(a)–(b).

134. *Id.* § 9-203(b)(3)(A)–(D).

the collateral.¹³⁵ However, “general intangibles” are not one of the listed types of collateral capable of possession or control.¹³⁶ As a result, attachment of an enforceable security interest in crypto-collateral would require an authenticated security agreement that describes the collateral.¹³⁷

Likewise, perfection of a security interest in crypto-collateral would generally require the filing of a valid UCC-1 financing statement.¹³⁸ Again, Article 9 provides special rules that provide alternative methods of perfecting a security interest.¹³⁹ However, these alternative methods of perfection only apply to certain types of collateral.¹⁴⁰ Article 9 authorizes control as a method of perfection for chattel paper, deposit accounts, letter-of-credit rights, negotiable documents, instruments, and investment property.¹⁴¹ Similarly, Article 9 recognizes possession as a method of perfection for tangible negotiable documents, goods, instruments, money, and tangible chattel paper.¹⁴² Notably, the list of collateral types does not include “general intangibles.”¹⁴³ Therefore, the alternative methods of perfection do not apply to crypto-collateral, which leaves filing of a financing statement as the only viable path to perfection.¹⁴⁴

Because the concepts of control and possession do not apply to general intangibles, the priority rules granting preference to secured lenders who perfect via these methods do not extend to crypto-collateral.¹⁴⁵ Instead, priority among competing security interests in the same crypto-collateral will be determined by the default rules of Section 9-322.¹⁴⁶

In short, the categorization of crypto-collateral as a “general intangible” affects the process of obtaining and enforcing a security interest. The most significant implication of treating crypto-collateral as a “general intangible”

135. *Id.*

136. *Id.*

137. *Id.* § 9-203.

138. *See* U.C.C. §§ 9-308, 9-310.

139. *See id.* §§ 9-310, 9-312, 9-313.

140. *Id.*

141. *Id.* § 9-312(a)–(b).

142. *Id.* § 9-313(a).

143. *Id.*

144. *See id.* § 9-310(b); *see also In re K-RAM, Inc.*, 451 B.R. 154, 173 (Bankr. D.N.M. 2011) (“Perfection by possession applies only to tangible negotiable documents, goods, instruments, money or tangible chattel paper. Perfection by control applies only to investment property, deposit accounts, letter-of-credit rights, electronic chattel paper and electronic documents.”); Fogg, *supra* note 7.

145. *See* Tu, *supra* note 2, at 547–49; *see also* U.C.C. §§ 9-327, 9-328, 9-329, 9-330.

146. *See* Tu, *supra* note 2, at 547–49; *see also* U.C.C. § 9–322.

is that the special rules relating to control and possession do not apply.¹⁴⁷ If this is the case, secured lenders must attach with an authenticated security agreement and perfect by filing a financing statement.¹⁴⁸ Using other methods of attachment and perfection may not create an enforceable security interest in crypto-collateral.¹⁴⁹ Moreover, to ensure priority over competing perfected security interests, secured lenders must be the first to file or perfect.¹⁵⁰ Article 9, therefore, is not specifically tailored to crypto-collateral, but it nonetheless allows for the collateralization of cryptocurrency by categorizing it as a “general intangible.”¹⁵¹

IV. THE FUTURE OF CRYPTO-COLLATERAL AND ARTICLE 9

The ability to obtain an enforceable security interest in cryptocurrency under Article 9 does not, however, mean that it is optimized for those who seek to do so. Thus, the author has argued in his prior work that Article 9 does not yet provide a consistent and efficient process for those who engage in secured transactions with crypto-collateral.¹⁵² Rather, it merely provides a serviceable solution.¹⁵³ Because of this, the author suggested that amending Article 9 to recognize cryptocurrency as a newly defined collateral type may be an appropriate step to take as commercial law evolves to address the broader implications of cryptocurrency.¹⁵⁴ Specifically, amending Article 9 would allow for the creation of rules tailored to the unique attributes of crypto-collateral.¹⁵⁵ Among other things, Article 9 could then extend the concept of control to crypto-collateral, improving certainty in both the creation and enforcement of security interest in cryptocurrency.¹⁵⁶

From the perspective of improving the functionality of secured lending transactions under Article 9, adding cryptocurrency as a new collateral type holds some appeal.¹⁵⁷ Doing so would likely benefit creditors and debtors who now deal with crypto-collateral.¹⁵⁸ However, providing a better process for securing loans with cryptocurrency is only one of many considerations

147. See, e.g., §§ 9-203(b)(3)(A)–(D), 9-312, 9-313, 9-327, 9-328, 9-329, 9-330.

148. See Tu, *supra* note 2, at 545–47.

149. Tu, *supra* note 2, at 545–47.

150. Tu, *supra* note 2, at 547–48.

151. See Tu, *supra* note 2, at 541–42; Fogg, *supra* note 7; Schroeder, *supra* note 90, at 30.

152. See Tu, *supra* note 2, at Part V.

153. Tu, *supra* note 2, at 573.

154. Tu, *supra* note 2, at 552.

155. Tu, *supra* note 2, at Part V.

156. Tu, *supra* note 2, at Part V.

157. Tu, *supra* note 2, at Part V.

158. See Tu, *supra* note 2, at Part V.

relevant to the question of whether to amend Article 9. To date, the conversation has often centered on technical issues relating to the collateralization of cryptocurrency under the U.C.C.¹⁵⁹ Does Article 9 allow for the creation of an enforceable security interest in cryptocurrency?¹⁶⁰ If so, what are the best practices for obtaining a valid and enforceable security interest in cryptocurrency?¹⁶¹ How could the U.C.C. be optimized for cryptocurrency collateral?¹⁶²

Instead of commenting further on how to optimize the U.C.C. for crypto-collateral, the author seeks to expand the discussion. Article 9, as it stands, is flexible enough to govern the use of cryptocurrency as collateral.¹⁶³ However, it does not expressly contemplate crypto-collateral and is in no way tailored to the nuances of crypto-collateral.¹⁶⁴ As such, the U.C.C. could be amended to improve Article 9 treatment of crypto-collateral.¹⁶⁵ With this foundation as the starting point, the author intends to begin examining the broader question of whether Article 9 should be amended for crypto-collateral. To be clear, the author does not endeavor to definitively answer this question. Rather, he seeks to highlight that the question of whether to amend Article 9 for crypto-collateral is complicated. The calculus involves more than simply asking how to create a better or more sensible framework for creditors and debtors who seek to use cryptocurrency as collateral.

Even though Article 9 treatment of crypto-collateral could be improved, the determination of whether an amendment is appropriate implicates a diverse array of issues. As such, the gains in efficiency and certainty for those engaged in secured transactions with crypto-collateral must be viewed in the context of other considerations, including: (1) the uncertain future of cryptocurrency; (2) the cost and difficulty of enacting a uniform amendment to the U.C.C.; and (3) the potential impact of further normalizing the use of

159. See generally Bierer, *supra* note 90 (exploring cryptocurrency collateral under existing Article 9 and suggesting possible revisions); Fogg, *supra* note 7 (critiquing Article 9's treatment of cryptocurrency as general intangibles and suggesting that they be re-categorized as investment property); Schroeder, *supra* note 90 (examining Article 9's treatment of cryptocurrency and the utility of Article 8's indirect ownership regime); Tu, *supra* note 2 (discussing best practices for collateralizing cryptocurrency under the existing provisions of Article 9 and setting forth a framework for amending Article 9 to recognize cryptocurrency as a new collateral type).

160. See *supra* note 159.

161. See *supra* note 159.

162. See *supra* note 159.

163. See *supra* note 159.

164. See *supra* note 159.

165. See Bierer, *supra* note 90, at Part V–VI; Fogg, *supra* note 7; Schroeder, *supra* note 90; Tu, *supra* note 2, at Part V.A.

cryptocurrency.¹⁶⁶ Ultimately, the author suggests that an understanding of all these issues should inform any decision on whether and when to amend the U.C.C. for crypto-collateral.

A. Increased Certainty and Improved Functionality

The primary benefit of amending Article 9 is the potential for increased efficiency and consistency in the U.C.C.'s treatment of crypto-collateral. That is to say, amending Article 9 provides an opportunity to tailor provisions specifically to crypto-collateral.¹⁶⁷ In doing so, Article 9 could adopt a framework that aligns with its treatment of similar collateral types, improving communication between parties and increasing certainty in the enforceability of security interests in crypto-collateral.¹⁶⁸ This would ostensibly benefit those who currently seek to secure transactions with crypto-collateral and establish a superior legal framework for the potentially growing number of parties who will seek to use cryptocurrency as collateral in the future.

Article 9 is serviceable, but those who wish to obtain security interests in cryptocurrency under current Article 9 face several challenges. One significant challenge is uncertainty as to the proper classification of cryptocurrency under Article 9. As noted above, Article 9 does not separately recognize crypto-collateral as a distinct collateral type.¹⁶⁹ As a result, it is necessary to fit crypto-collateral into a collateral type that is already defined in Article 9 (e.g., money, investment property, general intangible).¹⁷⁰ Classification of cryptocurrency, however, is complicated by the ongoing evolution of cryptocurrency use and the development new types cryptocurrencies. For example, ICOs appear to constitute a security under federal securities law, and tokens acquired in an ICO could arguably qualify as investment property under Article 9.¹⁷¹ But it does not appear that cryptocurrency will meet the definition of a security in all cases (for example, Bitcoin or Ethereum held directly).¹⁷² As a result, cryptocurrency that does not qualify as a security would likely fit the definition of general intangibles under Article 9.¹⁷³ In

166. See *infra* Parts III.B.–D.

167. See Tu, *supra* note 2, at 513.

168. See generally Tu, *supra* note 2, at Part V (discussing problems created by current Article 9's treatment of cryptocurrency and proposing the framework for an amendment that could mitigate some of the issues currently faced by those engaged in secured transactions with crypto-collateral).

169. U.C.C. §§ 1-201, 9-102.

170. See Bierer, *supra* note 90, at Part V–VI; Fogg, *supra* note 7; Lawless, *supra* note 7; Schroeder, *supra* note 90; Tu, *supra* note 2, at Part V.A.

171. See *supra* notes 117–123 and accompanying text.

172. See *supra* notes 117–123 and accompanying text.

173. See Fogg, *supra* note 7; Schroeder, *supra* note 90, at 30; Tu, *supra* note 2, at 542.

addition, the collateral type of “money” is potentially misleading. Cryptocurrency is used as a medium of exchange, and some governments have even taken steps to develop and launch government-backed cryptocurrencies.¹⁷⁴ However, cryptocurrency is intangible in nature. As a result, cryptocurrencies could be viewed as meeting some, but not all, of the requirements of Article 9’s definition of money.¹⁷⁵ Taken together, the classification of cryptocurrency under Article 9 is murky at best. Article 9 certainly accommodates cryptocurrency within the definition of general intangibles. But the extent to which cryptocurrency may fall within other Article 9 collateral types is uncertain.

This uncertainty is potentially problematic in several respects. Failing to properly classify cryptocurrency into an existing collateral type can lead to adverse consequences for those engaged in secured transactions because it impacts the permissible methods of attachment and perfection.¹⁷⁶ Accordingly, those who seek to obtain or pledge a security interest in crypto-collateral may misclassify it under Article 9 and fail to properly attach or perfect. In addition, uncertainty in the classification of crypto-collateral may impede communication as to the scope of a security interest.¹⁷⁷ Consider a security agreement that describes the collateral using a collateral type defined by Article 9—for example, consider a security agreement that grants a security interest in all the debtor’s investment property or general intangibles. Although Article 9 permits descriptions of this nature, a lack of clarity as to which collateral type encompasses cryptocurrency may lead to disputes between a creditor and debtor as to the scope of the security interest.¹⁷⁸ The use of a more specific description of the collateral may alleviate this risk.¹⁷⁹ However, the common practice of describing collateral by Article 9 collateral types means that the lack of clarity as to the classification of crypto-collateral may contribute to misunderstandings about the scope of a security interest between parties.¹⁸⁰

Similarly, uncertainty in the classification of crypto-collateral may adversely impact the notice filing system and communication among different creditors.¹⁸¹ Consider a UCC-1 financing statement that describes the collateral using a defined Article 9 collateral type. Again, the lack of clarity as to the classification of crypto-collateral means that the use of an Article 9 col-

174. See *supra* notes 99–109 and accompanying text.

175. See *supra* notes 99–109 and accompanying text.

176. See Tu, *supra* note 2, at 545–47; Schroeder, *supra* note 90, at 9–10.

177. See Tu, *supra* note 2, at 68–71 (explaining how Article 9 could improve identification of crypto-collateral and notice of security interests in crypto-collateral).

178. U.C.C. § 9-108(b)(3).

179. See Tu, *supra* note 2, at 551.

180. Tu, *supra* note 2, at 551, 568–71.

181. Tu, *supra* note 2, at 551, 568–71.

lateral type, such as investment property or general intangibles, may not effectively give notice to others about an existing security interest in the debtor's cryptocurrency.¹⁸² In short, Article 9's classification of crypto-collateral into an existing collateral type is not necessarily intuitive.¹⁸³ It is not clear to all that crypto-currency falls into a particular collateral type, and interested parties may come to differing conclusions in classifying crypto-collateral.¹⁸⁴ Ultimately, this creates the potential for misunderstandings about scope and subsequent disputes.

A related challenge for those engaged in secured transactions with crypto-collateral under current Article 9 is the lack of a clear-cut method of definitively establishing rights in crypto-collateral.¹⁸⁵ The existing provisions of Article 9 do provide a process for obtaining and enforcing a security interest in crypto-collateral by treating it as a general intangible.¹⁸⁶ But that process is not tailored to crypto-collateral, and it fails to address the unique risks of crypto-collateral.¹⁸⁷ In addition, the process is inconsistent with how Article 9 treats other types of collateral similar in nature to cryptocurrency, like money and investment property.¹⁸⁸

To the extent that crypto-collateral is treated as a general intangible under current Article 9, the provisions relating to control do not apply.¹⁸⁹ This is potentially problematic for several reasons. First, the risk of collateral loss is exacerbated for secured creditors. Nothing prevents a borrower from transferring crypto-collateral in violation of a security agreement.¹⁹⁰ Once this has occurred, the nature of cryptocurrency, specifically that transactions are irreversible and without personally identifiable information about the recipient, makes it difficult for a secured creditor to recover the collateral.¹⁹¹ Amending Article 9 to extend control to crypto-collateral minimizes this risk because secured creditors would be incentivized to establish and maintain control over crypto-collateral.¹⁹² By taking control—for example, by requir-

182. Tu, *supra* note 2, at 551, 568–71.

183. Tu, *supra* note 2, at 551, 568–71.

184. Tu, *supra* note 2, at 551, 568–71.

185. Tu, *supra* note 2, at 571–73.

186. Tu, *supra* note 2, at 551–56.

187. Tu, *supra* note 2, at 551–56.

188. Tu, *supra* note 2, at 551–66.

189. *See supra* Part II.B.

190. U.C.C. § 9-315(a).

191. *See, e.g.*, Tu, *supra* note 2, at 51–52 (noting that secured creditors may resort to steps outside of Article 9 of mitigate the increased risk of collateral loss and unauthorized transfer, but also noting that amending Article 9 is another option).

192. Tu, *supra* note 2, at 73.

ing that borrowers transfer cryptocurrency to the secured creditor's wallet—the secured creditor would be in a better position to prevent unauthorized transfers.¹⁹³

Moreover, the lack of control may lead to secured creditors having less certainty in the enforceability of a security interest in crypto-collateral.¹⁹⁴ Because control does not apply to general intangibles, priority over cryptocurrency classified as such is determined by the first to file a UCC-1 financing statement or perfect their security interest.¹⁹⁵ While this process provides a means of determining priority between creditors who both claim a security interest in the same crypto-collateral, Article 9's concept of control could provide a more clear-cut method of establishing priority. Article 9 allows a secured creditor to perfect a security interest in certain types of collateral by taking control of the collateral.¹⁹⁶ For certain types of collateral, a secured creditor that perfects by control has priority over a secured creditor who perfects by other means, such as filing of a UCC-1 financing statement.¹⁹⁷ If more than one secured creditor establishes control over the collateral, the first to do so has priority.¹⁹⁸ As a result, control can provide greater assurances of having priority in the event of debtor default. Specifically, the applicability of control incentivizes secured creditors to investigate the status of the collateral.¹⁹⁹ Secured creditors may then proceed with greater certainty in knowing that they are likely to obtain a first priority security interest, so long as they properly establish and maintain control over the collateral in question.²⁰⁰ Therefore, control provides a more clear-cut process for establishing priority and rewards those who take the appropriate steps to take control of collateral. Unfortunately, when cryptocurrency is classified as a general intangible, secured creditors are unable to avail themselves of this process.

In sum, Article 9 provides a means for obtaining and enforcing security interests in cryptocurrency. It accommodates crypto-collateral within the breadth of presently defined collateral types. However, Article 9 could be improved. Instead of simply forcing crypto-collateral into a framework that never contemplated cryptocurrency, Article 9 could be amended to mitigate or otherwise address some of the challenges facing those who now engage in secured transactions with crypto-collateral. For example, Article 9 could be amended to recognize crypto-collateral and definitively classify it, either by adding crypto-collateral as a newly defined Article 9 collateral type or ex-

193. Tu, *supra* note 2, at 73.

194. Tu, *supra* note 2, at 71–73.

195. *See supra* Part II.B.

196. U.C.C. § 9-314.

197. *See, e.g., id.* §§ 9-327, 9-328.

198. *Id.*

199. *See* Tu, *supra* note 2, at Part V.D.2.

200. Tu, *supra* note 2, at Part V.D.2.

panding the definition of an existing collateral type to expressly include cryptocurrency.²⁰¹ Such an amendment would eliminate uncertainty about the proper classification of cryptocurrency under Article 9, improving the ability of interested parties to communicate about the scope of a security interest and minimizing the potential of misunderstandings.²⁰² In addition, Article 9 could be amended to extend the concept of control to crypto-collateral.²⁰³ Doing so could provide a more effective and efficient process for obtaining enforceable rights in crypto-collateral and establish priority in the case of conflicting security interests over the same crypto-collateral.²⁰⁴

Ultimately, the question of how to amend Article 9 for cryptocurrency is beyond the scope of this Article. The purpose of providing examples of possible amendments is to highlight that amending Article 9 provides an opportunity to tailor Article 9 to cryptocurrency and provide a more appropriate legal framework for those who now use cryptocurrency as collateral. Thus, the ability to better meet the needs of those engaged in secured transactions with crypto-collateral is an important consideration in any decision to amend Article 9. However, the ability to improve the functionality of Article 9 for crypto-collateral and the benefits of doing so must be balanced against other relevant considerations.

B. The Challenges of Enacting a Uniform Amendment

Any decision to amend Article 9 should also involve careful consideration of the potential hurdles to enactment of a uniform amendment and the likelihood of successfully doing so. The process of developing and enacting a uniform amendment is no simple matter. Typically, it requires several years and involves action by various groups, which may include the American Law Institute (ALI), the Uniform Law Commission (ULC), and the legislatures of over fifty jurisdictions.²⁰⁵ Accordingly, the enactment of a uniform amendment to Article 9 could meet difficulties at several different junctures.

201. See Bierer, *supra* note 90; Fogg, *supra* note 7; Tu, *supra* note 2, at Part V.

202. See Tu, *supra* note 2, at Part V.

203. Tu, *supra* note 2, at Part V.

204. Tu, *supra* note 2, at Part V.

205. See generally *Uniform Commercial Code UCC*, AM. LAW INST. <https://www.ali.org/publications/show/uniform-commercial-code/> (last visited Feb. 5, 2019) (noting that the Permanent Editorial Board for the U.C.C. is a joint committee of both the ALI and the ULC, which approves and promulgates amendments to the U.C.C. when necessary); *New Project Proposals*, UNIF. L. COMM'N, <http://www.uniformlaws.org/Narrative.aspx?title=New%20Project%20Proposals> (last visited Feb. 5, 2019) (noting that a uniform or model act typically requires one year of study and two years of drafting meetings); *ULC Drafting Process*, UNIF. L. COMM'N, <http://www.uniformlaws.org/Narrative.aspx?title=ULC%20Drafting%20Process> (last visited Feb. 5, 2019) (noting that after completion of

Consider the first step of simply proposing a uniform amendment to Article 9 as a new project for the ALI and ULC. The ALI and the ULC will not approve all project proposals, so project approval presents an initial hurdle.²⁰⁶ The ALI's process begins with the generation of project ideas by the ALI Director and Projects Committee.²⁰⁷ After investigation and development of project proposal, the Projects Committee provides a recommendation to the ALI Council, which must then approve the project before drafting commences.²⁰⁸

In contrast, the ULC solicits proposals for new study and drafting projects twice a year.²⁰⁹ The ULC Committee on Scope and Program (the Committee) must make a determination on whether the subject merits consideration by the ULC.²¹⁰ In making a determination, the Committee may consider a number of questions, including the following:

- Is uniformity of state law for the proposed subject matter desirable and realistic?
- Would widespread enactment of the proposal produce significant benefits to the public?
- Will the proposed project facilitate the flow of commercial and other transactions across state lines?
- Will the proposed project reduce or eliminate conflicts of laws arising when the law of more than one state might apply?
- Will the proposed project fill an emergent need, modernize an antiquated concept, or codify the common law?
- What have states already done with regard to the subject matter of the proposed project?²¹¹

Even if the Committee decides to make an affirmative recommendation, the ULC's Executive Committee must still approve the proposal before assigning it to a study committee or drafting committee.²¹²

Even if the ALI and ULC decide to move forward with a proposal to amend Article 9 for crypto-collateral, the ensuing process could take several

drafting, commissioners must advocate for adoption in their home jurisdictions).

206. *How the Institute Works*, AM. LAW INST., <https://www.ali.org/about-ali/how-institute-works/> (last visited Feb. 5, 2019).

207. *Id.*

208. *Id.*

209. *See New Project Proposals*, *supra* note 205.

210. *See New Projects Criteria*, UNIF. L. COMM'N, <https://www.uniformlaws.org/projects/overview/newprojectcriteria> (last visited Feb. 5, 2019).

211. *See New Project Proposals*, *supra* note 205.

212. *See New Projects Criteria*, *supra* note 210.

years.²¹³ This often entails more than simply drafting the final text of a uniform amendment for promulgation to the states. The process often requires the identification and involvement of subject matter experts and interested groups (e.g., industry groups, consumer advocates, and consumer credit representatives) to help produce balanced, enactable legislation.²¹⁴ In addition, the ULC may form a committee to conduct research and determine whether drafting should commence.²¹⁵ According to the ULC, the development of a uniform act generally needs a minimum of one year of study and two years of drafting meetings.²¹⁶ When completed, a draft amendment is then submitted to the entire ULC for debate and approval.²¹⁷

The process of enacting a uniform amendment does not end there. ULC approval simply means that the act has been officially adopted as either a Uniform Act or a Model Act.²¹⁸ The ULC then promulgates the act for consideration by each of the fifty states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands.²¹⁹ Although the ULC may advocate for adoption, the last step is convincing the legislature of each jurisdiction to enact the uniform legislation.²²⁰ Absent widespread adoption, the introduction of an amendment to better accommodate crypto-collateral could ultimately undermine the goal of uniformity across jurisdictions.

As applied to a crypto-collateral focused amendment to Article 9, it seems fair to question whether there would be sufficient support from the ALI, ULC, and state legislatures. Consider, for example, the initial step of submitting a proposal to amend Article 9 for crypto-collateral. As described above, ULC approval depends on several factors.²²¹ Many of these factors do not clearly weigh in favor of moving forward with drafting of a uniform amendment.

On the one hand, widespread enactment of a crypto-collateral amendment for Article 9 would arguably provide significant benefits to the public, especially the growing number of people who now seek to use crypto-collat-

213. See *New Project Proposals*, *supra* note 205; see also David Frisch, *The Recent Amendments to UCC Article 9: Problems and Solutions*, 45 RICH. L. REV. 1009 (noting approval of the final text of revised Article 9 took eight years).

214. See *New Project Proposals*, *supra* note 205.

215. See *New Projects Criteria*, *supra* note 210.

216. See *New Project Proposals*, *supra* note 205.

217. See *ULC Drafting Process*, *supra* note 205 (explaining that a draft act must be considered section by section, at no less fewer than two annual meetings by all commissioners sitting as a Committee of the Whole, and noting that after approval, the final test is a vote by the states).

218. *ULC Drafting Process*, *supra* note 205.

219. *ULC Drafting Process*, *supra* note 205.

220. *ULC Drafting Process*, *supra* note 205.

221. See *New Project Proposals*, *supra* note 205.

eral in secured transactions.²²² In addition, optimizing Article 9 for crypto-collateral would seemingly facilitate the flow of commercial transactions across state lines by providing a more efficient and consistent means of enforcing security interests in cryptocurrency.²²³ Further, amending Article 9 to expressly recognize crypto-collateral would modernize the U.C.C. by incorporating an emergent type of collateral.

The foregoing notwithstanding, the public benefit of such an amendment is difficult to quantify. In theory, optimizing Article 9 for crypto-collateral would improve certainty and enforceability of security interests. But despite being sub-optimal, current Article 9 has not been the subject of widespread complaint. There has been no uproar or demand for change from those who must deal with crypto-collateral under current Article 9. Moreover, it does not appear that any state or jurisdiction has taken any affirmative step toward amending Article 9 for crypto-collateral. Accordingly, it is reasonable to take the position that amending Article 9 would result in little, if any, public benefit, and have little, if any, positive impact on facilitating the flow of commercial transactions across state lines. Stated simply, current Article 9 is not perfect, but it is working well enough. As such, there may be no pressing need or problem to remedy.

Moreover, the lack of any state-specific legislation to address crypto-collateral may weigh against approval to proceed with further study and drafting of a uniform amendment. If no state has acted to adopt state-specific legislation, then the goal of reducing or eliminating conflicts is not served. That is, the foundational objective of attaining uniformity does not justify the promulgation of a uniform amendment.

The dearth of legislative action to address Article 9's treatment of crypto-collateral is also potentially indicative of a lack of interest in taking up the issue at the state level. Ultimately, the reason or reasons for the lack of legislative will is irrelevant. It may stem from disinterest or lack of resources. It may arise from the belief that crypto-collateral is not sufficiently ubiquitous or that there is simply no significant problem with Article 9 as it stands. It may come from simple resistance to anything new or a misunderstanding about cryptocurrency and its impact on secured transactions. In the end, it does not really matter. The result is the same. Absent adequate support, any effort to develop and enact a uniform amendment will likely fail.

The foregoing accentuates the significance of evaluating the potential challenges to enactment of a uniform amendment, including the question of whether achieving uniformity of state law is realistic. The absence of both a desire to amend and a perceived need to do so is a significant consideration when examining the related questions of whether, and if, to amend Article 9 for crypto-collateral. Accordingly, the simple fact that Article 9 could be amended to improve its functionality for crypto-currency is only one factor.

222. *See supra* Part II.

223. *See supra* Part IV.A.

The ability to create a more efficient and consistent Article 9 framework for crypto-collateral must be balanced against other considerations and potential hurdles to development, drafting, and enactment of a uniform amendment.

C. The Unknown Future of Cryptocurrency

The unknown future of cryptocurrency, especially uncertainty over its long-term staying power and ongoing significance in commercial transactions, is also relevant to the question of whether to amend Article 9. Cryptocurrency is no longer a novelty or curiosity.²²⁴ In a relatively short period of time, cryptocurrency has made strides into the mainstream.²²⁵ Transaction volume has grown, and the number of merchants (both brick-and-mortar and web-based) that accept cryptocurrency has risen.²²⁶ Investment in cryptocurrency and cryptocurrency-related start-ups has increased.²²⁷ Cryptocurrency is even used as collateral to attain financing.²²⁸ But despite the emergence of legitimate mainstream commercial uses for cryptocurrency, there are reasons to question whether it is truly here to stay. As such, amending Article 9 for crypto-collateral may be premature if cryptocurrency is destined to fade away or fundamentally change in nature.

One reason to question the long-term relevance of cryptocurrency in commercial transactions is what seems to be a growing view among economists that Bitcoin's price gains are the result of a speculative bubble.²²⁹ Some prominent critics of cryptocurrencies, such as Warren Buffett, have offered a bleak assessment.²³⁰ In an interview, Buffett expressed his view of the future of cryptocurrency, saying, "In terms of cryptocurrencies, generally, I can say with almost certainty that they will come to a bad ending."²³¹ Robert Shiller, a Nobel Prize-winning economist, has also expressed skepticism over the future cryptocurrency, saying that Bitcoin "might totally collapse and be for-

224. Brito & Castillo, *supra* note 1, at 1.

225. *See* Brito & Castillo, *supra* note 1, at 1.

226. *See supra* notes 26, 36–41 and accompanying text.

227. *See* Brito & Castillo, *supra* note 1, at 14–15.

228. *See supra* Part II.B.

229. Ben Leubsdorf, *Is Bitcoin a Bubble? 96% of Economists Say 'Yes'*, WALL ST. J. (Dec. 13, 2017), <https://blogs.wsj.com/economics/2017/12/13/is-bitcoin-a-bubble-96-of-economists-say-yes/>.

230. *See* Brad Tuttle, *Bitcoin is Likely to 'Totally Collapse and Be Forgotten,' Nobel Prize-Winning Economist Says*, TIME (Jan. 19, 2018), <http://time.com/money/5109474/bitcoin-predictions-collapse-economist-robert-shiller/>; Brad Tuttle, *Warren Buffett Just Ripped Cryptocurrencies to Shreds*, TIME (Jan. 10, 2018), <http://time.com/money/5096862/warren-buffett-bitcoin-ripple-invest-cryptocurrency/>.

231. *See supra* note 230.

gotten.”²³² Shiller went on to say “I think that’s a good likely outcome.”²³³ Even so, Shiller ultimately acknowledged that Bitcoin “could linger on for a good long time,” and that it could even be here in one hundred years.²³⁴

If Bitcoin and other cryptocurrencies are indeed experiencing a bubble, the possibility of a total collapse factors into the wisdom of amending Article 9 for crypto-collateral. The value of cryptocurrency is one of the primary reasons that it is viable as a source of collateral.²³⁵ The value of Bitcoin has already dropped from a high of nearly \$20,000 U.S. dollars for a single bitcoin in December 2017.²³⁶ The price of a single bitcoin now trades at around \$3,615 U.S. dollars.²³⁷ Despite a significant fall in price, Bitcoin still holds value. But if the market was to totally collapse, the price of Bitcoin could conceivably drop to a point where it would no longer be viable as collateral. As a result, a price crash could diminish the use of cryptocurrency and its prevalence in commercial transactions. It goes without saying then that an amendment to Article 9 for crypto-collateral is unnecessary if cryptocurrency fades away and is no longer used as collateral.

The possibility of a crash is not the only reason to question the staying power of cryptocurrency. The development and launch of government-backed digital currencies and digital currency projects also casts doubt on the long-term viability of cryptocurrencies. The rise of cryptocurrencies, such as Bitcoin, has seemingly spurred governments to develop their own digital currencies and pursue digital currency related projects and partnerships.²³⁸ In January 2017, China’s central bank completed a successful trial of a digital bank acceptance exchange for settlement of transactions in digital currency.²³⁹ In the United Kingdom, the Bank of England has partnered with Ripple “to trial a blockchain-based technology that would make cross border payments and the movement of currencies more immediate.”²⁴⁰ Japan, Swe-

232. *See supra* note 230.

233. *See supra* note 230.

234. *See supra* note 230.

235. *See supra* Part I.A.2.

236. *See Bitcoin (USD) Price, supra* note 40.

237. *Bitcoin (USD) Price, supra* note 40.

238. *See* Qin Chen, *Next Stop in the Cryptocurrency Craze: A Government-Backed Coin*, CNBC (Nov. 30, 2017), <https://www.cnbc.com/2017/11/30/cryptocurrency-craze-springboards-government-backed-coin.html>.

239. *Id.*; *see also* Zhang Yuzhe & Han Wei, *PBOC Set to Be First to Issue Digital Bills*, CAIXIN (Jan. 25, 2017), <https://www.caixinglobal.com/2017-01-26/101049103.html>.

240. Lucy Burton, *Bank of England Trials Artificial Intelligence and Blockchain in Bid to Stay Ahead of the Pack*, TELEGRAPH (Mar. 17, 2017), <https://www.telegraph.co.uk/business/2017/03/17/bank-england-trials-artificial-intelligence-blockchain-bid-stay/>.

den, and Estonia are among those who have announced plans to develop a government-backed digital currency: J-coin for Japan, E-Krona for Sweden, and Estcoin for Estonia.²⁴¹ Others who have expressed interest launching their own digital currency include Uruguay and Kazakhstan.²⁴² In the United States, the Federal Reserve has indicated that it is in the early stages of exploring the idea of its own digital currency.²⁴³

The foregoing examples highlight the growing level of government interest in cryptocurrency and how to leverage the blockchain technology to improve the speed of cross-border payments and transaction settlement. The impact of these efforts along with the introduction of government-backed digital currencies is uncertain. However, it is reasonable to ponder whether these efforts may portend the end of cryptocurrency as it is now known. For example, the application of blockchain technology to improve the speed of cross-border payments and the introduction of government-backed digital currencies could conceivably usurp and supplant much of the space now inhabited by cryptocurrencies such as Bitcoin. As a result, government-backed digital currencies could push cryptocurrencies aside. Even if cryptocurrencies such as Bitcoin remain, they may have less prevalence in commercial trans-

241. See Chen, *supra* note 238; see also Ryan Browne, *Estonia Wants to Launch Its Own Cryptocurrency Called 'Estcoin'*, CNBC (Aug. 23, 2017), <https://www.cnbc.com/2017/08/23/estonia-cryptocurrency-called-estcoin.html> (describing Estonia's proposal to launch a state-backed cryptocurrency called "Estcoin"); Arjun Kharpal, *Japanese Banks are Thinking of Making Their Own Cryptocurrency Called J-Coin*, CNBC (Sept. 27, 2017), <https://www.cnbc.com/2017/09/27/japanese-banks-cryptocurrency-j-coin.html> (describing efforts by Japanese Banks to develop a digital currency "pegged" to the Yen called "J-Coin"); *Riksbank's E-Krona Project During 2018*, RIKSBANK, <https://www.riksbank.se/eng/financial-stability/payments/e-krona/the-riksbanks-e-krona-project-during-2018/> (describing efforts in Sweden to develop the "E-Krona").
242. See Chen, *supra* note 238; Nikhelish De, *Uruguay's Central Bank New Digital Currency Pilot*, COINDESK (Sept. 22, 2017), <https://www.coindesk.com/central-bank-of-uruguays-president-announces-digital-currency-pilot-program/> (discussing the announcement of a digital currency pilot by Uruguay's Central Bank); see also Ryan Browne, *Kazakhstan Plans to Launch Its Own Cryptocurrency*, CNBS (Oct. 17, 2017), <https://www.cnbc.com/2017/10/17/kazakhstan-plans-to-launch-its-own-cryptocurrency.html> (discussing Kazakhstan's plans to launch its own cryptocurrency).
243. See Matthew Boesler, *Count New York Fed's Dudley Among Bitcoin Skeptics*, BLOOMBERG (Nov. 29, 2018), <https://www.bloomberg.com/news/articles/2017-11-29/count-new-york-fed-s-dudley-among-the-bitcoin-skeptics> (William Dudley, President of the Federal Reserve Bank of New York, stated that "I think at this point it's really very premature to be talking about the Federal Reserve offering digital currencies, but it is something we are starting to think about."); see also Jeff Cox, *Federal Reserve Starting to Think About Its Own Digital Currency*, CNBC (Nov. 29, 2017), <https://www.cnbc.com/2017/11/29/federal-reserve-starting-to-think-about-its-own-digital-currency-dudley-says.html>.

actions. Moreover, the addition of government-backed digital currencies may have a substantive impact on any amendment to Article 9. Cryptocurrencies such as Bitcoin, by definition, are not backed by a government, central bank, or commodity. A government-backed digital currency, therefore, could be similar to a cryptocurrency. But it would be distinct in at least one fundamental way. Because of this, an amendment to Article 9 to accommodate cryptocurrencies such as Bitcoin may not be appropriate for government-backed digital currencies. Accordingly, amending Article 9 to accommodate crypto-collateral may be unnecessary, or at least premature, as the landscape is still evolving.

Finally, it is worth briefly mentioning that disparate views about the legality of cryptocurrency and how to regulate it may contribute to an uncertain future. Broadly speaking, a government's approach to cryptocurrency can be divided into one of three categories—those that prohibit or ban cryptocurrency, those that permit the use of cryptocurrency subject to some form of regulation, and those that have not addressed the question or remain silent.²⁴⁴ For example, the use of cryptocurrency is illegal in countries like Ecuador, Bolivia, Bangladesh, Morocco, and Vietnam.²⁴⁵ Where cryptocurrency is not illegal, the regulatory environment is developing at a rapid pace and may vary widely from country to country. In the United States, for example, cryptocurrency is now subject to a host of potential legal and regulatory requirements,²⁴⁶ including state and federal tax laws;²⁴⁷ state-specific regulatory regimes, like New York's BitLicense;²⁴⁸ state money transmitter laws;²⁴⁹

244. See Tu & Meredith, *supra* note 1, at 301; see also *Statistics for Bitcoin's Legality Around the World*, BITCOINIST.COM (Apr. 18, 2018), <https://bitcoinist.com/11-countries-bitcoin-still-illegal/> [hereinafter *Statistics for Bitcoin's Legality*].

245. See *Statistics for Bitcoin's Legality*, *supra* note 244.

246. See Tu, *supra* note 2, at Part II.B.

247. See, e.g., *IRS Virtual Currency Guidance: Virtual Currency Is Treated as Property for U.S. Federal Tax Purposes; General Rules for Property Transactions Apply* (Mar. 25, 2014), <https://www.irs.gov/newsroom/irs-virtual-currency-guidance>; Kelly Phillips Erb, *IRS Nabs Big Win Over Coinbase in Bid for Bitcoin Customer Data*, FORBES (Nov. 29, 2018), <https://www.forbes.com/sites/kellyphillipserb/2017/11/29/irs-nabs-big-win-over-coinbase-in-bid-for-bitcoin-customer-data/#7a0a9135259a>.

248. See N.Y. COMP. CODES R. & REGS. tit. 23, ch. I, pt. 200 (2017); N.Y. STATE DEP'T OF FIN. SERVS., ORDER PURSUANT TO N.Y. BANKING LAW §§ 2-B, 24, 32, 102-A, 4001-B; N.Y. FINANCIAL SERVICES LAW §§ 301(C) 302(A) (2014), <http://www.dfs.ny.gov/about/ea/ea140311.pdf>.

249. See, e.g., Money Transmission Act, CONN. GEN. STAT. ANN. §§ 36a-595–612 (West 2017); North Carolina Money Transmitters Act, N.C. GEN. STAT. ANN. §§ 53-208.41–208.64 (West 2017); Money Transmitter Act, 7 PA. STAT. AND CONS. STAT. ANN. §§ 6101–6117 (West 2017); KAN. OFFICE OF THE STATE BANK COMM'R, REGULATORY TREATMENT OF VIRTUAL CURRENCIES UNDER THE KANSAS MONEY TRANSMITTER ACT MT 2014-01 (2014), <http://www>.

the anti-money laundering provisions of the federal Bank Secrecy Act;²⁵⁰ and federal securities laws.²⁵¹ In contrast, China severely restricts the use of cryptocurrency by prohibiting financial institutions from participating in cryptocurrency transactions.²⁵²

The regulatory environment, however, is not static. It is constantly evolving and developing. At present, it appears that the pendulum is swinging towards more stringent regulation of cryptocurrency with a seemingly widespread crackdown on cryptocurrency in progress.²⁵³ The following examples from the United Kingdom, the European Union, India, China, and Russia illustrate the range of action, from statements of intent to the imposition of increased regulation. In the United Kingdom, the Bank of England's governor signaled a regulatory intervention in likening the trading of cryptocurrencies to anarchy, raising concerns that one of the main reasons for

osbckansas.org/mt/guidance/mt2014_01_virtual_currency.pdf; TEX. DEP'T OF BANKING, REGULATORY TREATMENT OF VIRTUAL CURRENCIES UNDER THE TEXAS MONEY SERVICES ACT 1037 (2014), <http://www.dob.texas.gov/public/uploads/files/consumer-information/sm1037.pdf>; WASH. STATE DEP'T OF FIN. INSTS., INTERIM REGULATORY GUIDANCE ON VIRTUAL CURRENCY ACTIVITIES (2014), <http://dfi.wa.gov/documents/money-transmitters/virtual-currency-interim-guidance.pdf>.

250. See U.S. DEP'T OF THE TREASURY FIN. CRIMES ENF'T NETWORK, FIN-2013-G001, APPLICATION OF FINCEN'S REGULATIONS TO PERSONS ADMINISTERING, EXCHANGING, OR USING VIRTUAL CURRENCIES (2013); U.S. DEP'T OF THE TREASURY FIN. CRIMES ENF'T NETWORK, FIN-2014-R011, REQUEST FOR ADMINISTRATIVE RULING ON THE APPLICATION OF FINCEN'S REGULATIONS TO A VIRTUAL CURRENCY TRADING PLATFORM (2014); U.S. DEP'T OF THE TREASURY FIN. CRIMES ENF'T NETWORK, FIN-2014-R012, REQUEST FOR ADMINISTRATIVE RULING ON THE APPLICATION OF FINCEN'S REGULATIONS TO A VIRTUAL CURRENCY PAYMENT SYSTEM (2014).
251. See, e.g., *Statement on Cryptocurrencies and Initial Coin Offerings*, *supra* note 117; *SEC Statement*, *supra* note 117; U.S. Sec. & Exch. Comm'n v. Shavers, No. 4:13-cv-416, 2013 WL 4028182, at *2 (E.D. Tex. Aug. 6, 2013).
252. See Matthew Braga, *As Merchants Embrace Bitcoin, Digital Currency Still Struggles for Regulatory Approval Worldwide*, FIN. POST (Jan. 20, 2014), http://business.financialpost.com/2014/01/20/bitcoin-currency-merchants-regulators-2014/?_lsa=592b-fc15; Kashmir Hill, *Bitcoin in China: The Fall-out from Chinese Government Banning Real World Use*, FORBES (Dec. 6, 2013), <https://www.forbes.com/sites/kashmirhill/2013/12/06/bitcoin-in-china-the-fall-out-from-chinese-government-banning-real-world-use/#4ffb253b481a>; Tu & Meredith, *supra* note 1, at 303; *Statistics for Bitcoin's Legality*, *supra* note 244.
253. See, e.g., Leeza Mangaldas, *Understanding India's Cryptocurrency Crackdown*, FORBES (Apr. 18, 2018), <https://www.forbes.com/sites/leezamangaldas/2018/04/18/understanding-indias-cryptocurrency-crackdown/#10d3f9be5ca6>; John Wasik, *Why Bitcoin, Cryptocurrency Crackdown is Gaining Steam*, FORBES (Feb. 12, 2018), <https://www.forbes.com/sites/johnwasik/2018/02/12/why-bitcoin-cryptocurrency-crackdown-is-gaining-steam/#17ca548b7fb5>.

the use of cryptocurrency is to shield illicit activities and stating that the time had come to “regulate elements of the crypto-asset ecosystem to combat illicit activities.”²⁵⁴ The European Union has also warned that it will regulate cryptocurrencies if there is no clear international response to its emerging risks.²⁵⁵ In Russia, the Ministry of Finance has announced plans to criminalize the use of cryptocurrencies as monetary substitutes.²⁵⁶ In contrast to these statements, the Reserve Bank of India (RBI) has already acted, issuing a decree that requires all RBI regulated bodies “to stop having business relationships with entities dealing with virtual currencies” and “unwind existing relationships” within three months.²⁵⁷ China is another country that has taken steps to increase regulation, banning both cryptocurrency exchanges and initial coin offerings.²⁵⁸

Significantly, the recent crackdown on cryptocurrency is not limited to increased government regulation. A number of financial institutions and some of the internet’s largest platforms have also taken action. JPMorgan Chase & Co., Bank of America Corp., Citigroup Inc., Capital One, Wells Fargo, and Discover have all banned the use of their credit cards to purchase cryptocurrencies.²⁵⁹ The ban, however, is not limited to U.S.-based financial institutions. The Bank of Montreal and the Lloyds Banking Group (which includes the Halifax brand and Bank of Scotland) have both announced a similar ban for its customers.²⁶⁰ In addition to bans on the use of credit cards to purchase cryptocurrency, many Internet platforms have opted to ban

254. Richard Partington, *Bitcoin Faces Regulatory Crackdown, Bank of England Warns*, GUARDIAN (Mar. 2, 2018), <https://www.theguardian.com/business/2018/mar/02/bitcoin-faces-regulatory-crackdown-bank-england-warns>.
255. Samuel Gibbs, *EU Finance Head: We Will Regulate Bitcoin If Risks Are Not Tackled*, GUARDIAN (Feb. 26, 2018), <https://www.theguardian.com/technology/2018/feb/26/eu-finance-head-regulate-bitcoin-cryptocurrencies-risks>.
256. Ryan Derousseau, *All The Place Now Cracking Down on Bitcoin and Cryptocurrencies*, TIME (Mar. 19, 2018), <http://time.com/money/5198439/all-the-places-now-cracking-down-on-bitcoin-and-cryptocurrencies/>.
257. See Mangaldas, *supra* note 253.
258. See Sara Hsu, *China Serious About Ending ICOs, Cryptocurrency Exchanges*, FORBES (Feb. 7, 2018), <https://www.forbes.com/sites/sarahsu/2018/02/07/china-serious-about-ending-icos-cryptocurrency-exchanges/#432d19a95675>; Derousseau, *supra* note 256.
259. See Naeem Aslam, *Banks Banning Cryptocurrency Purchase on Credit Cards, Why?*, FORBES (Feb. 5, 2018), <https://www.forbes.com/sites/naemaslam/2018/02/05/banks-banning-cryptocurrency-purchase-on-credit-cards-why/>; Jennifer Surane & Laura J. Keller, *Bitcoin Ban Expands Across Credit Cards as Big U.S. Banks Recoil*, BLOOMBERG (Feb. 2, 2018), <https://www.bloomberg.com/news/articles/2018-02-02/bofa-to-decline-all-cryptocurrency-transactions-on-credit-cards>.
260. See Aslam, *supra* note 259; Lawrence White & Emma Rumney, *Banks in Britain and U.S. Ban Bitcoin Buying with Credit Cards*, REUTERS (Feb. 4, 2018),

cryptocurrency related advertising because it is “frequently associated with deceptive or misleading practice.”²⁶¹ Those who have banned cryptocurrency related advertising include Facebook, Google, Twitter, Snap, Reddit, and MailChimp.²⁶² These platforms no longer allow ads about initial coin offerings, cryptocurrency wallets, cryptocurrency trading, and the like.²⁶³ The long-term effect of this advertising ban is unclear. The effort to eliminate deceptive and misleading advertising may facilitate the growth of cryptocurrency by making it safer. On the other hand, the ad ban may stunt or even cripple the growth of cryptocurrency by making it more difficult for startups to build awareness and attract investment.

Taken together, the illegality of cryptocurrency in certain jurisdictions combined with disparate regulation and an increasingly hostile stance towards cryptocurrency highlight the lack of a clear consensus on cryptocurrency. Moreover, the rapid changes and momentum towards more stringent regulation accentuate the fact that the legal and regulatory framework for cryptocurrency is still in flux. This raises legitimate questions about whether it is too early to amend Article 9 for cryptocurrency, because it is unclear where the law will settle and whether the present view of cryptocurrency will substantially change in the future. For example, could the dominant view shift so that a majority of jurisdiction simply opt to make cryptocurrency illegal? Even if cryptocurrency remains legal, could the recent regulatory crackdown on cryptocurrency lead to its demise or decrease its utility in commercial transactions? Alternatively, might the increased regulatory scrutiny benefit cryptocurrency by making it safer and more legitimate? The

<https://www.reuters.com/article/us-lloyds-bank-uk-bitcoin/banks-in-britain-and-u-s-ban-bitcoin-buying-with-credit-cards-idUSKBN1FO0UL>.

261. See Louise Matsakis, *The Cryptocurrency Industry Might Actually Benefit from an Ad Ban*, WIRED (Apr. 4, 2018), <https://www.wired.com/story/cryptocurrency-industry-might-benefit-from-ad-ban/>; see also *New Ads Policy: Improving Integrity and Security of Financial Products and Services*, FACEBOOK (Jan. 30, 2018), <https://www.facebook.com/business/news/new-ads-policy-improving-integrity-and-security-of-financial-product-and-services-ads> (listing cryptocurrency as a prohibited financial product).

262. See Matsakis, *supra* note 261; see also *New Ads Policy: Improving Integrity and Security of Financial Products and Services*, *supra* note 261; see also Jilian D’Onfro, *Google Will Ban All Cryptocurrency-related Advertising*, CNBC (Mar. 13, 2018), <https://www.cnbc.com/2018/03/13/google-bans-crypto-ads.html>; Ian Wren, *Google Follows Facebook in Banning Cryptocurrency Ads*, NAT’L PUB. RADIO (Mar. 14, 2018), <https://www.npr.org/sections/thetwo-way/2018/03/14/593553255/google-follows-facebook-in-banning-cryptocurrency-ads>; Hannah Murphy & Alice Woodhouse, *Google Bans Cryptocurrency Advertising*, FIN. TIMES (Mar. 14, 2018), <https://www.ft.com/content/45f49684-2776-11e8-b27e-cc62a39d57a0>; Daisuke Wakabayashi, *Google Bans Bitcoin Advertisements in Policy Change*, N.Y. TIMES (Mar. 14, 2018), <https://www.nytimes.com/2018/03/14/technology/google-bitcoin-advertising.html>.

263. See *supra* note 262.

point is that the future of cryptocurrency is uncertain. It is clear that cryptocurrency now plays a role in commercial transactions, but whether it will continue to do so in the future is an unknown. As such, the indeterminacy of cryptocurrency's long-term viability and the sheer number of variables currently in flux appear to suggest that it is not yet the appropriate time to amend Article 9 for crypto-collateral.

D. Further Normalization of Cryptocurrency

This article concludes by raising one final consideration as potentially relevant to the questions of whether and when to amend Article 9 for crypto-collateral. Up until this point, the analysis has primarily focused on considerations related to Article 9: whether an amendment could improve the existing Article 9 framework for crypto-collateral,²⁶⁴ whether the challenges and costs of enacting a uniform amendment to Article 9 could be overcome, whether the benefit of doing so is justified at this juncture,²⁶⁵ and whether the uncertain future of cryptocurrency makes an amendment to Article 9 premature or wholly unnecessary.²⁶⁶ The author now examines broader implications outside of Article 9—specifically, the potential for an amendment to further normalize cryptocurrency use and some of the potential ramifications of doing so. In effect, the author begins to tackle the normative question of whether the normalization of cryptocurrency is a good thing. If so, amending Article 9 for crypto-collateral may advance the development of an appropriate legal and regulatory environment for the legitimate use of cryptocurrency. If not, amending Article 9 for crypto-collateral may have the effect of needlessly perpetuating cryptocurrency.

To date, the response to cryptocurrency in the United States has largely been characterized by a willingness to permit cryptocurrency use subject to the development of appropriate laws and regulation.²⁶⁷ Cryptocurrency,

264. *See supra* Part III.A.

265. *See supra* Part III.B.

266. *See supra* Part III.C.

267. *See* Tu & Meredith, *supra* note 1, at 301; Tu, *supra* note 2, at 14; *see also* James Gatto & Elsa S. Broeker, *Bitcoin and Beyond: Current and Future Regulation of Virtual Currencies*, 9 OHIO ST. ENTREPRENEURIAL BUS. L.J. 429 (2015) (providing an overview of recent efforts to regulate virtual currency in the United States); *Hearing Before the Subcommittee on Commerce, Manufacturing, and Trade of the Committee on Energy and Commerce House of Representatives*, 114th Cong. 4–5 (2016) (statement of Rep. Tony Cardenas) (“If digital currencies are to be widely accepted at [sic] legitimate payments, they need to provide sufficient safeguards for their users, and they need to come under an adequate regulatory regime to address unlawful use, particularly in terms of money laundering and financing of terrorism. . . . States are already figuring out how to regulate these new products and markets. Federal agencies are monitoring digital currency markets.”).

therefore, is not illegal in the United States.²⁶⁸ Instead, attempts have been made to clarify the applicability of existing laws and regulations to cryptocurrency. The Internal Revenue Service (IRS) has issued guidance regarding the taxation of cryptocurrency.²⁶⁹ The U.S. Department of the Treasury Financial Crimes Enforcement Network (FinCEN) has issued guidance to explain its position on when the exchange of cryptocurrency constitutes regulated money transmission under the federal Bank Secrecy Act.²⁷⁰ States have started to follow with guidance and legislation to address similar issues under state money transmitter laws.²⁷¹ The SEC has sought to clarify how federal securities laws apply to cryptocurrency and cryptocurrency exchanges.²⁷² Cryptocurrency-specific laws, such as New York's BitLicense, have also been enacted.²⁷³

These efforts to develop a legal and regulatory framework for cryptocurrency provided a needed response to some of the most pressing challenges posed by the rise of cryptocurrency. Even so, the author questions whether there may have been another, lesser scrutinized effect on cryptocurrency becoming more mainstream. That is, cryptocurrency may have benefited from regulatory legitimacy. Suppose that each legal and regulatory development lends added legitimacy to cryptocurrency use, making it more acceptable and increasing the willingness of people to adopt it. If this is the case, the legal and regulatory response to cryptocurrency has likely contributed to the growing mainstream popularity of cryptocurrency as a payment method and means of investment. To be sure, regulatory legitimacy is not solely responsible for the rise of cryptocurrency. Each of the following likely played a part as well: media coverage of cryptocurrency,²⁷⁴ investment in cryptocurrency businesses,²⁷⁵ service providers that facilitate cryptocurrency

268. See Tu, *supra* note 2, at 14; *Statistics for Bitcoin's Legality*, *supra* note 244.

269. See *supra* note 247.

270. See *supra* note 250.

271. See Tu & Meredith, *supra* note 1, at 301; see also *Statistics for Bitcoin's Legality*, *supra* note 244.

272. See Tu & Meredith, *supra* note 1, at 301; see also *Statistics for Bitcoin's Legality*, *supra* note 244.

273. See Tu & Meredith, *supra* note 1, at 301; see also *Statistics for Bitcoin's Legality*, *supra* note 244.

274. See Alexavier Guzman, *The Ripple Effect of Cryptocurrencies*, FORBES (Jan. 11, 2018), <https://www.forbes.com/sites/forbesproductgroup/2018/01/11/the-ripple-effect-of-cryptocurrencies/#4efb7bda6080>.

275. See Brito & Castillo, *supra* note 1, at 1 (noting growth of investment and involvement of traditional financial institutions); Paul Vigna & Michael J. Casey, *Coinbase Raises \$75 Million in Funding Round*, WALL ST. J. (Jan. 20, 2015), <https://www.wsj.com/articles/coinbase-raises-75-million-in-funding-round-1421762403>.

transactions,²⁷⁶ and the number of merchants willing to accept cryptocurrency.²⁷⁷ But the role of regulatory legitimacy in helping cryptocurrency move beyond early perceptions of being a mere curiosity, or only suitable for use by criminals, should not be dismissed.

Amending Article 9 for crypto-collateral may, therefore, have the effect of further normalizing cryptocurrency use via regulatory legitimacy. By noting this, the author does not intend to take a definitive position on whether this is a good or bad result. Rather, he seeks to highlight that the broader impact of regulatory legitimacy ought to be considered in a decision to amend Article 9 for cryptocurrency. To date, it appears the foundational question of whether the normalization of cryptocurrency is meritorious has been overlooked in the rush to develop a legal framework for cryptocurrency. At this point, a fair critique is that it may very well be too late. In the United States, at least, the decision has arguably been made. The development of a legal and regulatory framework for cryptocurrency is well under way.²⁷⁸ As such, any legitimacy stemming from amending Article 9 to expressly permit crypto-collateral would be insignificant. Even so, the decision to amend Article 9 provides an opportunity to take a step back and more fully examine the virtues of further normalizing cryptocurrency use.

Despite the frequently touted benefits of cryptocurrency,²⁷⁹ there are legitimate reasons to question whether the growing use of cryptocurrency is beneficial for commercial transactions and society at large. Critics have long raised concerns about the use of cryptocurrency to support criminal enterprise, noting that the anonymity of cryptocurrency transactions makes it attractive for those engaging in illegal activity.²⁸⁰ In addition, the speculative

276. See Tu & Meredith, *supra* note 1, at Part II.D. (describing the rise of an industry of cryptocurrency service providers).

277. See Tu, *supra* note 2, at 15.

278. See Brito & Castillo, *supra* note 1, at 2; Tu, *supra* note 2, at Part II.B.; Tu & Meredith, *supra* note 1, at Part III.B.2.

279. See Tu & Meredith, *supra* note 2, at Part I.B. (describing potential benefits such as (1) lower costs and fees; (2) fewer risks for merchants; (3) increased anonymity for users; (4) increased speed and ease of transfer/payment; and (5) less susceptibility to government manipulation and inflationary pressures); see also *Why Use Bitcoin?*, COINDESK (Jan. 28, 2018), <http://www.coindesk.com/information/why-use-bitcoin/>.

280. See Jason Bloomberg, *Using Bitcoin or Other Cryptocurrency to Commit Crimes? Law Enforcement Is Onto You*, FORBES (Dec. 28, 2017), <https://www.forbes.com/sites/jasonbloomberg/2017/12/28/using-bitcoin-or-other-cryptocurrency-to-commit-crimes-law-enforcement-is-onto-you/#761fc5603bdc> (identifying four primary areas of criminal activity that lend themselves to cryptocurrency: tax evasion, money laundering, contraband transactions, and extortion); Jason Bloomberg, *Bitcoin: 'Blood Diamonds' of the Digital Era*, FORBES (Mar. 28, 2017), <https://www.forbes.com/sites/jasonbloomberg/2017/03/28/bitcoin-blood-diamonds-of-the-digital-era/#1b52eca6492a> (suggesting

and largely unregulated nature of cryptocurrency makes it ripe for fraudulent investment scams.²⁸¹ More recently, concerns have surfaced about the environmental impact of cryptocurrency mining activities.²⁸² Now that the use of cryptocurrency has become more established, policymakers may be in a better position to evaluate whether the benefits of legitimate cryptocurrency use outweigh the potential harms of undesirable cryptocurrency applications.

The use of cryptocurrency in connection with criminal activity is one issue that sharply divides its critics and supporters. On the one hand, critics contend that the features of cryptocurrency make it useful primarily for criminals and that much of the underlying value of cryptocurrency derives from its utility for criminal enterprise.²⁸³ In addition, the launch of increasingly anonymous cryptocurrency variants, such as Monero and Dash, suggests that some cryptocurrency is largely about facilitating crime.²⁸⁴ Supporters, however, view criminal activity as little more than an unfortunate

that criminal enterprise is largely responsible for the value of Bitcoin); Aatif Sulleyman, *Bitcoin Price is So High Because Criminals are Using it for Illegal Trades, Research Suggests*, INDEPENDENT (Jan. 24, 2018), <https://www.independent.co.uk/life-style/gadgets-and-tech/news/bitcoin-price-fall-criminals-blockchain-anonymous-cryptocurrency-zcash-monero-dash-a8174716.html> (citing a study that concluded almost half of all bitcoin transactions are associated with illegal activity and noting that researchers have linked a quarter of bitcoin users with crime).

281. See, e.g., Ted Knutson, *Cryptocurrency Fraud Widespread, Warns Regulator*, FORBES (Apr. 10, 2018), <https://www.forbes.com/sites/tedknutson/2018/04/10/cryptocurrency-fraud-widespread-warns-regulator/#82c63c16b069> (discussing widespread fraud among cryptocurrency investment promoters); David Z. Morris, *The Rise of Cryptocurrency Ponzi Schemes*, ATLANTIC (May 31, 2017), <https://www.theatlantic.com/technology/archive/2017/05/cryptocurrency-ponzi-schemes/528624/> (discussing the rise of cryptocurrency Ponzi schemes).
282. See, e.g., Alex Hern, *Bitcoin's Energy Usage is Huge – We Can't Afford to Ignore It*, GUARDIAN (Jan. 17, 2018), <https://www.theguardian.com/technology/2018/jan/17/bitcoin-electricity-usage-huge-climate-cryptocurrency>; Nathaniel Popper, *There is Nothing Virtual About Bitcoin's Energy Appetite*, N.Y. TIMES (Jan. 21, 2018), <https://www.nytimes.com/2018/01/21/technology/bitcoin-mining-energy-consumption.html>.
283. See Bloomberg, *Using Bitcoin or Other Cryptocurrency*, *supra* note 280; see, e.g., Derek A. Dion, *I'll Gladly Trade You Two Bits on Tuesday for A Byte Today: Bitcoin, Regulating Fraud in the e-Economy of Hacker-Cash*, 2013 U. ILL. J.L. TECH. & POL'Y 165, 179–80 (2013); Reuben Grinberg, *Bitcoin: An Innovated Alternative Digital Technology*, 4 HASTINGS SCI. & TECH. L.J. 159, 168–76 (2012); Robert Stokes, *Anti-Money Laundering Regulation and Emerging Payment Technologies*, 32 BANKING & FIN. SERVICES POL'Y REP. 4 (2013).
284. See Bloomberg, *Using Bitcoin or Other Cryptocurrency*, *supra* note 280.

side effect of cryptocurrency's growing popularity.²⁸⁵ Cryptocurrency, like many things, can be used for both legitimate and illicit purposes.²⁸⁶

There is some truth to both positions. Cryptocurrency is increasingly utilized in legitimate ways. As an alternative method payment, cryptocurrency provides some advantages over credit and debit cards, including lower costs and quicker settlement.²⁸⁷ The foregoing notwithstanding, there is little doubt that the anonymity of cryptocurrency is attractive to criminals, and many cryptocurrency transactions are connected to illegal activity.²⁸⁸ A recent study by the University of Sydney and the University of Technology Sydney found that forty-four percent of Bitcoin transactions and twenty-five percent of all users were associated with illegal activity.²⁸⁹ Accordingly, the researchers suggested that approximately twenty-four million Bitcoin market participants use the cryptocurrency "primarily for illegal purposes."²⁹⁰

With a significant portion of cryptocurrency transactions associated with illegal activity, it is reasonable to question whether the continued normalization of cryptocurrency makes sense. That is to say, does regulatory legitimacy simply perpetuate a tool used primarily for furthering criminal activity? Because the anonymity of cryptocurrency makes it more difficult and costly for law enforcement to investigate criminal activity,²⁹¹ the answer is arguably yes. Thus, the normative question of whether the ongoing proliferation of cryptocurrency is meritorious depends on the benefits of its legitimate uses as compared to the harm of illicit uses, accounting for the effectiveness of legal, regulatory, and technological developments to curb criminal activity associated with cryptocurrency.

Another well-chronicled concern is the rise of cryptocurrency-related frauds and the associated risk of loss to potential investors. Skeptics and reg-

285. See Bloomberg, *Using Bitcoin or Other Cryptocurrency*, *supra* note 280.

286. See Brito & Castillo, *supra* note 1, at 67 (noting that Bitcoin, as a technology, is neither good nor bad).

287. See Tu & Meredith, *supra* note 1; *Why Use Bitcoin?*, *supra* note 279.

288. See Joshua J. Doguet, *The Nature of the Form: Legal and Regulatory Issues Surrounding the Bitcoin Digital Currency System*, 73 LA. L. REV. 1119, 1119 (2013); Bloomberg, *Using Bitcoin or Other Cryptocurrency*, *supra* note 280; Grinberg, *supra* note 283, at 204; Kier Thomas, *Could the Wikileaks Scandal Lead to New Virtual Currency?*, PC WORLD (Dec. 10, 2010), http://www.pcworld.com/businesscenter/article/213230/could_the_wikileaks_scandal_lead_to_new_virtual_currency.html.

289. See Sulleyman, *supra* note 280.

290. See Sulleyman, *supra* note 280.

291. See Tu & Meredith, *supra* note 1, at 299; *Bitcoin Transactions Aren't as Anonymous as Everyone Hoped*, *supra* note 72 (describing methods of linking people to their Bitcoin transactions); Bloomberg, *Using Bitcoin or Other Cryptocurrency*, *supra* note 280 (describing Bitcoin transaction monitoring technology as a tool for law enforcement).

ulators have long cautioned that the speculative nature of cryptocurrency and its price volatility presents a risk for those who use it as a means of investment.²⁹² In addition, concerns about cybersecurity, combined with the irreversibility of transactions, heighten the risk of loss from cyber-attacks and theft.²⁹³ Cryptocurrency-related scams, however, present an increasingly widespread problem.²⁹⁴ In the United States, for example, the Federal Trade Commission (FTC) has reported that consumers were defrauded out of \$542 million in cryptocurrency scams during the first two months of 2018.²⁹⁵ The FTC predicted that this number would rise to \$3 billion by the end of the year.²⁹⁶ Cryptocurrency fraud is also escalating outside the United States. In Australia, cryptocurrency fraud is now the second most common type of in-

292. See, e.g., *Bitcoin: More Than a Bit Risky*, FIN. INDUS. REG. AUTH., <http://www.finra.org/investors/alerts/bitcoin-more-bit-risky> (last updated May 7, 2014); *Investor Alert: Bitcoin and Other Virtual Currency-Related Investments*, U.S. SEC. & EXCH. COMM'N (May 7, 2014), https://www.sec.gov/oiea/investor-alerts-bulletins/investoralertsia_bitcoin.html; *Ponzi Schemes Using Virtual Currencies*, U.S. SEC. & EXCH. COMM'N OFFICE OF INV'R EDUC. & ADVOCACY (2013), https://www.sec.gov/investor/alerts/ia_virtualcurrencies.pdf [hereinafter *Ponzi Schemes Alert*]; Michelle Singletary, *Bitcoin Is All the Rage But Is It Worth the Risk?*, WASH. POST. (Jan. 23, 2018), https://www.washingtonpost.com/news/get-there/wp/2018/01/23/bitcoin-is-all-the-rage-but-is-it-worth-the-risk/?noredirect=on&utm_term=.8d8a77f59df1; Leubsdorf, *supra* note 229; Tuttle, *Bitcoin is Likely to 'Totally Collapse and Be Forgotten'*, *supra* note 230; Tuttle, *Warren Buffett Just Ripped Cryptocurrencies to Shreds*, *supra* note 230.

293. See, e.g., Alex Lielacher, *Bitcoin as an Investment: Opportunities and Risks*, NASDAQ (Jan. 31, 2017), <https://www.nasdaq.com/article/bitcoin-as-an-investment-opportunities-and-risks-cm740800>; *Risk of Bitcoin Hacks and Losses is Very Real*, FORTUNE (Aug. 29, 2016), <http://fortune.com/2016/08/29/risk-of-bitcoin-hacking-is-real/>; Daniel Shane, *Crypto Hacks: Is Your Bitcoin Investment Safe?*, CNN MONEY (June 13, 2018), <https://money.cnn.com/2018/06/13/investing/bitcoin-cryptocurrency-hacks-security/index.html>; Annie Nova, *How to Stop Your Digital Fortune From Going Up in Smoke*, CNBC (Jan. 26, 2018), <https://www.cnbc.com/2018/01/26/security-issues-reach-a-peak-within-cryptocurrencies-.html>.

294. See, e.g., Knutson, *supra* note 281; Morris, *supra* note 281; Deep Patel, *6 Red Flags of an ICO Scam*, TECHCRUNCH (Dec. 7, 2017), <https://techcrunch.com/2017/12/07/6-red-flags-of-an-ico-scam/>; Shane Shifflett & Coulter Jones, *Buyer Beware: Hundreds of Bitcoin Wanabes Show Hallmarks of Fraud*, WALL ST. J. (Mar. 17, 2018), <https://www.wsj.com/articles/buyer-beware-hundreds-of-bitcoin-wannabes-show-hallmarks-of-fraud-1526573115>.

295. *FTC: Crypto Scams Will Total \$3 Billion By End of 2018*, FINDER (June 26, 2018), <https://www.finder.com/ftc-crypto-scams-3-billion-2018>.

296. See *id.*

vestment scam.²⁹⁷ According to the Australian Competition and Consumer Commission (ACCC), cryptocurrency frauds have become increasingly prevalent in the last twelve months.²⁹⁸ The ACCC's deputy chair, Delia Rickard, opined further that "[t]he rise in popularity in cryptocurrency has not been missed by scammers who are latching onto this new trend to con people."²⁹⁹

It is clear then that an upsurge in cryptocurrency scams has accompanied the growth of main stream cryptocurrency use. Scams involving cryptocurrency take many different forms, which include hacking,³⁰⁰ phishing attacks,³⁰¹ pyramid schemes,³⁰² Ponzi schemes,³⁰³ bait-and-switch schemes,³⁰⁴ exit scams,³⁰⁵ and deceptive marketing of investment opportuni-

297. Samburaj Das, *Cryptocurrency Fraud Now Second Most Common Investment Scam in Australia*, CCN (July 23, 2018), <https://www.ccn.com/cryptocurrency-fraud-now-second-most-common-investment-scam-in-australia/>.

298. *See id.*

299. *Id.*

300. *See, e.g.*, Neil Chilson, *It's Time for a FTC Blockchain Working Group*, FED. TRADE COMM'N (Mar. 16, 2018), <https://www.ftc.gov/news-events/blogs/techftc/2018/03/its-time-ftc-blockchain-working-group> (describing ransomware cases where bad actors hack a computer, hold files hostage, and demand payments); Ben Rossen, *Ransomware – A Closer Look*, FED. TRADE COMM'N (Nov. 10, 2016), <https://www.ftc.gov/news-events/blogs/business-blog/2016/11/ransomware-closer-look> (discussing ransomware).

301. *See, e.g.*, Jen Wieczner, *Cryptocurrency Hackers Are Stealing from EOS's \$4 Billion ICO Using This Sneaky Scam*, FORTUNE (May 31, 2018), <http://fortune.com/2018/05/31/cryptocurrency-eos-ico-scam/> (describing how scammers prey on anticipation of an ICO by sending emails to trick investors); *Phishing in Cryptocurrency: How to Avoid Scam and Save Your Money*, MEDIUM (Mar. 23, 2018), <https://medium.com/@Changelly/phishing-in-cryptocurrency-how-to-avoid-scams-and-save-your-money-d3d1b442a16a> (describing phishing attempts).

302. *See, e.g.*, Angela Moscaritolo, *Government Shuts Down Cryptocurrency Pyramid Scammers*, ENTREPRENEUR (Mar. 19, 2018), <https://www.entrepreneur.com/article/310646> (describing Federal Trade Commission efforts to shut down the operation of pyramid schemes); Wolfie Zhao, *Police Bust Alleged \$13 Million Crypto Pyramid Scheme*, COINDESK (Apr. 18, 2018), <https://www.coindesk.com/chinese-police-bust-alleged-13-million-blockchain-pyramid-scheme/> (describing a pyramid scheme that amassed \$13 million from over 13,000 people in China).

303. *See, e.g.*, *Ponzi Schemes Alert*, *supra* note 292 (describing Ponzi schemes involving virtual currency); Morris, *supra* note 281 (describing the OneCoin Ponzi scheme).

304. *FTC to Host Cryptocurrency Workshop on June 25*, FED. TRADE COMM'N (Apr. 30, 2018), <https://www.ftc.gov/news-events/press-releases/2018/04/ftc-host-cryptocurrency-workshop-june-25> (listing common cryptocurrency investment schemes).

ties.³⁰⁶ To be clear, the author does not suggest that the mere existence of fraud should cast doubt on the merits of mounting mainstream cryptocurrency use. Fraudsters and scammers are not unique to cryptocurrency investments. Other means of investment, from real estate to securities, suffer similarly. However, cryptocurrency investments arguably present a unique opportunity for fraud due to the combination of investors who lack an understanding of how the technology works and a relatively lax regulatory environment.³⁰⁷ In examining cryptocurrency investments, the question of whether growing mainstream use is beneficial depends on: (1) the value of legitimate cryptocurrency investment as a means of fundraising; (2) the harm of cryptocurrency frauds, including mounting losses suffered by victims; and (3) the likelihood that efforts to educate investors³⁰⁸ and increase regulatory

305. See Shobhit Seth, *What's a Cryptocurrency Exit Scam? How Do You Spot One?*, INVESTOPEDIA (Mar. 23, 2018) <https://www.investopedia.com/tech/whats-cryptocurrency-exit-scam-how-spot-one/> (describing exit scams where promoters vanish with investor money during or after an ICO, including recent exit scams during the Confido and LoopX initial coin offerings); Arjun Kharpal, *Cryptocurrency Start-Up Disappears with \$375,000 from an ICO, and Nobody Can Find the Founders*, CNBC (Nov. 21, 2017), <https://www.cnbc.com/2017/11/21/confido-ico-exit-scam-founders-run-away-with-375k.html> (Confido founders vanished after raising \$375,000 in an initial coin offering); *Team Behind \$660M ICO in Vietnam Disappears*, PYMNTS.COM (Apr. 23, 2018), <https://www.pymnts.com/cryptocurrency/2018/modern-tech-vietnam-ico-exit-scam/> (discussing exit scams after ICOs raising \$660 million and \$4.5 million).

306. See, e.g., *At FTC's Request, Court Halts Bogus Bitcoin Mining Operation*, FED. TRADE COMM'N (Sept. 23, 2014), <https://www.ftc.gov/news-events/press-releases/2014/09/ftcs-request-court-halts-bogus-bitcoin-mining-operation> (describing deceptive marketing of Bitcoin mining machines); *App Developer Settles FTC and New Jersey Charges it Hijacked Consumers' Phones to Mine Cryptocurrency*, FED. TRADE COMM'N (Jan. 29, 2015), <https://www.ftc.gov/news-events/press-releases/2015/06/app-developer-settles-ftc-new-jersey-charges-it-hijacked>.

307. See, e.g., Morris, *supra* note 281.

308. See, e.g., Nikhilesh De, *The SEC Just Launched a Fake ICO Website to Educated Investors*, COINDESK (May 16, 2018), <https://www.coindesk.com/the-sec-just-launched-a-fake-ico-website-to-educate-investors/>; Elizabeth Kwok, *Know the Risks Before Investing in Cryptocurrencies*, FED. TRADE COMM'N (Feb. 16, 2018), <https://www.ftc.gov/news-events/blogs/business-blog/2018/02/know-risks-investing-cryptocurrencies>; *ICOs—Howeycoins*, U.S. SEC. & EXCH. COMM'N, <https://www.investor.gov/howeycoins> (last visited Feb. 5, 2019); *Investor Bulletin: Initial Coin Offerings*, U.S. SEC. & EXCH. COMM'N, https://www.sec.gov/oiea/investor-alerts-and-bulletins/ib_coinofferings (last visited Feb. 5, 2019).

scrutiny³⁰⁹ will curtail cryptocurrency fraud and adequately protect investors from harm.³¹⁰ In the absence of both legitimate reasons to permit cryptocurrency investment opportunities and adequate investor protections, the risk of financial harm and the amount of losses suffered by victims of unchecked cryptocurrency fraud may counsel against the furtherance of mainstream cryptocurrency use.

Finally, the environmental impact of cryptocurrency mining is germane. The growing use of cryptocurrency has seemingly little to do with environmental issues such as climate change. However, the massive amount of energy consumed by computers engaged in cryptocurrency mining activities has led to concerns about the adverse environmental impact of cryptocurrencies.³¹¹ Moreover, the increasingly widespread popularity and use of cryptocurrencies may exacerbate the problem.³¹²

At its most basic level, mining is the process by which new cryptocurrency tokens enter the system.³¹³ The creation of new tokens depends on the use of computational power to solve increasingly difficult math puzzles with new cryptocurrency tokens as the “reward” for the first miner to successfully do so.³¹⁴ As a result, the growing value of cryptocurrency has created a race, with miners competing against one another.³¹⁵ This competition has evolved

309. See *SEC Statement*, *supra* note 117; Nathaniel Popper, *Subpoenas Signal S.E.C. Crackdown on Initial Coin Offerings*, N.Y. TIMES (Feb. 28, 2018), <https://www.nytimes.com/2018/02/28/technology/initial-coin-offerings-sec.html>.

310. See *SEC Statement*, *supra* note 117.

311. See, e.g., Anthony Cuthbertson, *Bitcoin Mining On Track to Consume All of the World's Energy by 2020*, NEWSWEEK (Dec. 11, 2017), <http://www.newsweek.com/bitcoin-mining-track-consume-worlds-energy-2020-744036>; Chris Mooney & Steven Mufson, *Why the Bitcoin Craze is Using Up So Much Energy*, WASH. POST (Dec. 19, 2017), https://www.washingtonpost.com/news/energy-environment/wp/2017/12/19/why-the-bitcoin-craze-is-using-up-so-much-energy/?utm_term=.c5bed71b233c; *Generating Bitcoin Now Uses More Energy Than Ireland*, MAYNOOTH UNIV. (Feb. 13, 2018), <https://www.maynoothuniversity.ie/news-events/generating-bitcoin-now-uses-more-energy-ireland>; Karl J. Odwyer & David Malone, *Bitcoin Mining and Its Energy Footprint*, MAYNOOTH UNIV., <http://eprints.maynoothuniversity.ie/6009/1/DM-Bitcoin.pdf> (studying the energy cost of Bitcoin mining).

312. See Hern, *supra* note 282; Popper, *supra* note 282.

313. See Brito & Castillo, *supra* note 1, at 8 (describing the process of mining).

314. See Brito & Castillo, *supra* note 1, at 8.

315. See, e.g., Patrick Daniels, *These Are The Largest Bitcoin Mining Farms in the World*, DIGITAL TRENDS (July 1, 2018), <https://www.digitaltrends.com/cool-tech/largest-bitcoin-mining-farm/> (describing bitcoin mining farms); Anna Hirtenstein, *Bitcoin Sparks PE Fund to Back Wind Farm on Manhattan-Sized Plot*, BLOOMBERG (July 27, 2018), <https://www.bloomberg.com/news/articles/2018-07-27/bitcoin-mining-private-equity-build-wind-farm-in-morocco> (dis-

into an arms race of sorts, with miners building “cryptocurrency” farms, or warehouses filled with high speed computer servers dedicated to mining.³¹⁶

The amount of electricity used to power computers used in mining is already significant.³¹⁷ Estimates vary, but some research suggests that the amount of electricity consumed by cryptocurrency per year now exceeds the annual energy consumption of many countries.³¹⁸ The Bitcoin Energy Consumption Index estimates global mining of Bitcoin alone consumes over seventy-one terawatts of electricity per year, which is more than the annual electricity consumption of countries like Venezuela and Belgium.³¹⁹ Global mining of Ethereum requires an additional 20.79 terawatts of electricity per year.³²⁰

The point is that cryptocurrency mining is an energy-intensive enterprise.³²¹ Moreover, the energy demands of cryptocurrency far exceeds that of other payment systems. Although the comparison is imperfect, looking at the Bitcoin network relative to Visa provides useful context. According to Digiconomist’s energy consumption analysis, a single Bitcoin transaction requires 954 Kilowatt-hours of electricity, where 100,000 Visa transactions requires 169 Kilowatt-hours of electricity.³²² Accordingly, the sheer energy demands of cryptocurrency presents questions about long-term sustainability and whether it poses a legitimate climate threat.

In addition to the environmental implications, server farms may create a host of other problems for the communities in which they are located.³²³ Min-

cussing plans to build a wind farm for purposes of powering a bitcoin mining operation).

316. See Paul Roberts, *This is What Happens When Bitcoin Miners Take Over Your Town*, POLITICO (Mar./Apr. 2018), <https://www.politico.com/magazine/story/2018/03/09/bitcoin-mining-energy-prices-smalltown-feature-217230>; *Bitcoin Has a Dirty, Dirty Secret*, FORTUNE (Dec. 15, 2017), <http://fortune.com/2017/12/15/bitcoin-dirty-secret-energy-use-pollution/>.

317. See, e.g., Cuthbertson, *supra* note 311; Mooney & Mufson, *supra* note 311.

318. See Cuthbertson, *supra* note 311; *Bitcoin Energy Consumption Index*, DIGICONOMIST, <https://digiconomist.net/bitcoin-energy-consumption> (last visited Feb. 5, 2019).

319. *Bitcoin Energy Consumption Index*, *supra* note 318.

320. *Ethereum Energy Consumption Index*, DIGICONOMIST, <https://digiconomist.net/ethereum-energy-consumption> (last visited Feb. 5, 2019).

321. Popper, *supra* note 282 (citing figures from Morgan Stanley that suggest the creation of one digital token consumes as much electricity as the average American household uses in two years and the total network of computers plugged into the Bitcoin network consumes as much energy each day as some medium-size countries).

322. *Bitcoin Energy Consumption Index*, *supra* note 318.

323. See, e.g., Alexis Madrigal, *Bitcoin Mining Turns Electricity Into Money*, ATLANTIC (Mar. 12, 2018), <https://www.theatlantic.com/technology/archive/2018/>

ers tend to gravitate to rural areas with low energy costs.³²⁴ Public utility districts must then deal with a rapid increase in demand that significantly outpaces planned growth, including a flood of new requests for additional power.³²⁵ Mining activity can also stress existing power grids. In Chelan, Washington, utility crews regularly find “unpermitted home miners running computer servers far too large for the electrical grids of residential neighborhoods,” which can cause transformers to overheat.³²⁶ Residents may also see increased power rates as less surplus energy is exported to outside buyers.³²⁷ Cryptocurrency mining, therefore, has a pronounced local impact, and communities must ultimately decide whether keeping up with the energy demands is worthwhile.

The use of cryptocurrency to support criminal activity, the proliferation of fraudulent cryptocurrency investment schemes, and the potentially adverse environmental impact of cryptocurrency mining indicate that a decision to amend Article 9 for crypto-collateral may reverberate beyond Article 9. By expressly recognizing crypto-collateral, amending Article 9 adds legitimacy to the use of cryptocurrency—not only the use of cryptocurrency as collateral, but perhaps for other uses as well. Therefore, the growth of a legal and regulatory framework for cryptocurrency may normalize cryptocurrency and contribute to its growth. Accordingly, the development of a legal and regulatory framework may indirectly perpetuate undesirable applications of cryptocurrency and exacerbate the harm caused by such uses.

Because of this, an informed deliberation about amending Article 9 for crypto-collateral should not focus solely on matters related to Article 9. It should also consider the wide-ranging implications of continued mainstream cryptocurrency use. The conversation about amending Article 9 for crypto-collateral presents an opportunity to re-examine the broader question of whether the continued growth of cryptocurrency is worthwhile, including the role of regulatory legitimacy in promulgating cryptocurrency use.

To be clear, the author does not suggest that the development of all cryptocurrency laws and regulation should halt because it contributes to the growth of cryptocurrency use and may exacerbate the harms of such use. Rather, he contends it is appropriate to regularly examine the fundamental question of whether the continued growth of cryptocurrency is desirable. Doing so allows policymakers to consider new data and utilize an improved

03/bitcoin-mining-arbitrages-cheap-electricity-into-money/555416/; Paul Roberts, *Bitcoin Backlash as ‘Miners’ Suck Up Electricity, Stress Power Grids in Central Washington*, SEATTLE TIMES (May 26, 2018), <https://www.seattletimes.com/business/bitcoin-backlash-as-miners-suck-up-electricity-stress-power-grids-in-central-washington/>.

324. *See supra* note 323.

325. Roberts, *Bitcoin Backlash as ‘Miners’ Suck Up Electricity*, *supra* note 323.

326. *Id.*

327. *Id.*

understanding of cryptocurrency's real-world impact, including: (1) how cryptocurrency evolves over time; (2) new applications and uses; (3) the scale of problems; (4) newly identified risks and concerns; and (5) the effectiveness of regulatory responses. In addition, the pressure to react quickly to a specific issue is lessened because steps have already been taken to address some of the most pressing legal issues presented by cryptocurrency.³²⁸ Absent the need to resolve a multitude of issues, policymakers can now consider cryptocurrency policy more broadly. Therefore, as time passes, policymakers are in a better position to answer the normative question of whether continued cryptocurrency use is meritorious. As such, the conversation about amending Article 9 ought to examine the depths of this question, including the role of regulatory legitimacy in promulgating cryptocurrency use and the feasibility of adequately curbing the undesirable aspects of cryptocurrency use.

V. CONCLUSION

The expansion of mainstream cryptocurrency uses and its growing presence in secured transactions suggests that the time may have come to start addressing the broader commercial law implications of cryptocurrency. But the question of whether to amend Article 9 to expressly accommodate crypto-collateral is complicated. Answering the question requires more than debating the best way to optimize the process of taking and enforcing security interests in crypto-collateral. In fact, focusing the conversation so narrowly is a mistake. Informed cryptocurrency policymaking requires a wider view of issues relevant to both Article 9 and cryptocurrency generally. As such, the potential benefits for parties engaged in secured transactions with crypto-collateral is but one factor.³²⁹ The challenges of drafting and promulgating a uniform amendment, including legislative will to do so, is another.³³⁰ Additionally, the uncertain future of cryptocurrency, particularly the many threats to long-term viability, is relevant.³³¹ Also relevant are questions about the scope of problems under existing Article 9 and whether crypto-collateral use is sufficiently ubiquitous.³³² Finally, amending Article 9 provides an important opportunity to evaluate the effectiveness of efforts to mitigate the harms of cryptocurrency use and revisit the question of whether continued

328. See Tu, *supra* note 2, at Part II.B. (describing legal and regulatory developments in response to the rise of cryptocurrency); see also Brito & Castillo, *supra* note 1, at 2 (noting that cryptocurrency has attracted the attention of regulators).

329. See *supra* Part IV.A.

330. See *supra* Part IV.B.

331. See *supra* Part IV.C.

332. See *supra* Part IV.B.

mainstream cryptocurrency use remains worthwhile.³³³ These are just some of the most noteworthy considerations. As the conversation continues about the broader commercial law implications of cryptocurrency, policymakers should take care to explore the breadth of relevant issues.

333. *See supra* Part IV.D.