

I. Overstock Completes First Public Stock Issuance Using Blockchain

On December 15, 2016, online retailer Overstock.com, Inc. (Overstock) completed a groundbreaking stock issuance featuring securities that trade exclusively on a new blockchain digital platform.¹ This was the first stock issuance to utilize blockchain, a disruptive technology with the potential to transform the way securities are issued and traded.² Blockchain's arrival to the securities market has generated considerable buzz—both positive and negative—among industry experts.³ Critics assert that blockchain is incompatible with current market practices that rely on post-trade service providers and require delays in trade settlement times.⁴ Advocates claim that the new technology will facilitate safe, transparent, and efficient securities transactions.⁵ Widespread optimism about the technology's potential

¹ Tom Zanki, *Overstock Issues First-Ever Blockchain Shares in \$11M Offer*, LAW360 (Dec. 16, 2016, 5:35 PM), <https://www-law360-com.ezproxy.bu.edu/securities/articles/873790/overstock-issues-first-ever-blockchain-shares-in-11m-offer> [<https://perma.cc/94L8-4JDJ>].

² Joshua Ashley Klayman & F. Dario de Martino, *The (Heart)Beat Has Sounded: The World Economic Forum Places Blockchain Front and Center*, CLIENT ALERT (Morrison & Foerster LLP, New York, N.Y.), Aug. 18, 2016, at 2–3, <https://media2.mofo.com/documents/160817-world-economic-forum-blockchain.pdf> [<https://perma.cc/4F5N-YAEX>] (“Blockchain has the potential to disrupt today’s big disrupters and transform nearly all industries, particularly those that rely on trusted intermediaries (clearinghouses, custodians, exchanges and fiduciaries) or that require central governmental authorities.”).

³ Compare Ginni Rometty, *How Blockchain Will Change Your Life*, WALL ST. J. (Nov. 7, 2016), <http://www.wsj.com/articles/howblockchainwillchange-yourlife1478564751> [<https://perma.cc/CBH2-T7P4>] (“[O]nce [Blockchain is] widely adopted, it will transform the world.”), with Anna Irrera, *5 Problems With Using Blockchain To Speed Up Share Trading*, MKT. WATCH (Feb. 22, 2016), <http://www.marketwatch.com/story/5-problems-with-using-blockchain-to-speed-up-share-trading-2016-02-22> [<https://perma.cc/9ABX-RBHG>] (warning that the use of blockchain in securities transactions will face “massive difficulties”).

⁴ See, e.g., Irrera, *supra* note 3 (warning that the use of blockchain to help automate securities processing will face “insurmountable” difficulties); see also *infra* text accompanying notes 98–106.

⁵ Zanki, *supra* note 1 (“[B]lockchain’s absence of intermediaries makes it more efficient than existing records systems while its transparent nature prevents tampering.”).

has prompted numerous issuers, exchanges, and industry experts to consider developing blockchain-based platforms.⁶ A number of legislators have likewise embraced the prospect of a blockchain securities market.⁷ Regulators, meanwhile, have begun preparing for the impact that blockchain could have on payment, clearing, and settlement processes.⁸

This article examines Overstock's blockchain securities offering and the current state of blockchain's role in the U.S. securities market. First, Section A explores the basic concepts underlying the technology. Second, Section B dissects Overstock's offering, including the company's development of its own blockchain platform, the Securities and Exchange Commission (SEC) approval process, the stock issuance, and Overstock's strategic vision for its future in blockchain trading. Third, Section C considers the potential impact that blockchain could have on the securities industry at large and explains the technology's advantages and limitations. Fourth, Section D surveys legislative and regulatory initiatives to facilitate blockchain securities offerings. Lastly, Section E concludes with a brief summation of blockchain's current role in securities markets and the position the technology could occupy in the future.

⁶ See, e.g., Shivdeep Dhaliwal, *Why Stock Markets Love Blockchain*, THE COINTELEGRAPH (Dec. 6, 2016), <https://cointelegraph.com/news/why-stock-markets-love-blockchain> [<https://perma.cc/77FM-5ZU7>] (explaining that exchanges in Germany, South Korea, London, and elsewhere have explored the possibility of using blockchain to settle and trade securities); Stan Higgins, *Nasdaq Wants to Invest in More Blockchain Startups*, COINDESK (Apr. 19, 2017), <http://www.coindesk.com/nasdaq-wants-invest-blockchain-startups/> [<https://perma.cc/A3D3-3JQZ>] (“Exchange operator Nasdaq is looking to invest in blockchain startups as part of a new venture initiative.”).

⁷ See, e.g., Tom Zanki, *Delaware Blockchain Plans Look Good For Digital Shares*, LAW360 (May 3, 2016, 4:22 PM), https://www-law360-com.ezproxy.bu.edu/articles/791941/delaware-blockchain-plans-look-good-for-digital-shares?article_related_content=1 [<https://perma.cc/BNX2-CEHD>] (reporting efforts by Delaware legislators to update the state's legal and regulatory environment to promote blockchain technology).

⁸ See Lael Brainard, Member of Fed. Reserve Bd. of Governors, Speech at the Inst. of Int'l Fin. Annual Meeting Panel on Blockchain: Distributed Ledger Technology (Oct. 7, 2016), <https://www.federalreserve.gov/newsevents/speech/brainard20161007a.htm> [<https://perma.cc/LN6D-8CP5>] (acknowledging that the Federal Reserve Board views blockchain as “the most significant development in many years in payments, clearing, and settlement”).

A. Understanding Blockchain Technology

Blockchain, also known as distributed ledger technology, has the potential to facilitate a wide variety of digital transactions.⁹ Although complex algorithms drive blockchain technology, one can understand the underlying concepts without a background in computer science.¹⁰ As one expert put it, “Blockchain is a truly extraordinary technology that does really mundane things.”¹¹ In essence, a blockchain is a ledger of transactions with “universally verifiable and trackable data.”¹² As the name suggests, the ledger consists of a series of “blocks,” each of which contains information about a particular transaction.¹³ The parties to a given transaction must verify the details contained within the corresponding block in order for the transaction to move forward.¹⁴ As parties complete additional transactions, the chain of blocks grows.¹⁵ Blocks from previous transactions are locked in place, but the information contained within past blocks remains accessible.¹⁶ Security features prevent any party from tampering with

⁹ See Klayman & de Martino, *supra* note 2, at 4–5.

¹⁰ *Id.* at 2.

¹¹ Tina Wadhwa & Dan Bobkoff, *Blockchain Could Soon Power Stock Markets, Music Sales, and Even Prevent Child Labor – Here’s How it Works*, BUS. INSIDER (Oct. 16, 2016), <http://www.businessinsider.com/what-is-blockchain-2016-10> [<https://perma.cc/TE2T-C5AT>].

¹² Klayman & de Martino, *supra* note 2, at 2.

¹³ *Id.*; Wadhwa & Bobkoff, *supra* note 11.

¹⁴ Wadhwa & Bobkoff, *supra* note 11.

¹⁵ Klayman & de Martino, *supra* note 2, at 2–3; Collin Thompson, *How Does the Blockchain Work (For Dummies) Explained Simply*, MEDIUM: INTREPID REV. (Oct. 2, 2016), <https://medium.com/the-intrepid-review/how-does-the-blockchain-work-for-dummies-explained-simply-9f94d386e093#.8nb708fbg> [<https://perma.cc/N7UK-6CFD>].

¹⁶ Adrian Lee & Kihoon Hong, *How Blockchain Technology is About to Transform Sharemarket Trading*, THE CONVERSATION (Feb. 3, 2016), <http://the-conversation.com/how-blockchain-technology-is-about-to-transform-sharemarket-trading-53807> [<https://perma.cc/G2XQ-SZ3E>]; Wadhwa & Bobkoff, *supra* note 11.

past information.¹⁷ The result is a secure, chronological record that tracks every detail of every transaction within the chain.¹⁸

For example, imagine an investor wants to buy stock in a publicly traded company.¹⁹ Completing the stock purchase requires action from a number of entities.²⁰ First, the investor's bank would verify that the investor has sufficient funds to execute the stock purchase.²¹ The bank would then transfer those funds to a brokerage.²² Second, a broker would execute a trade for the desired stock.²³ Third, the stock exchange would receive and process the order.²⁴ Finally, the investor would receive confirmation that the purchase was complete and the company's stock would be added to the investor's portfolio.²⁵ In a blockchain-based system, each step of this process would be recorded and "added to the blockchain" in real time.²⁶ Before the transaction could move forward, the entities involved in a given step of the process would have to verify their actions and record the details

¹⁷This security is grounded in cryptographic hashing technology, which, depending on the strength of the cryptography, makes it "virtually impossible, or mathematically and computationally improbable" for a hacker to access sensitive private information just by looking at coded data output on the chain. Joseph Chow, *Blockchain Underpinnings: Hashing*, MEDIUM: CONSENSYS (Jan. 13, 2016), <https://medium.com/@ConsenSys/blockchain-underpinnings-hashing-7f4746cbd66b#.doxgacitc> [<https://perma.cc/QR9H-HZQ4>]; see also REED SMITH, *BEYOND BITCOIN: BLOCKCHAIN: THE ESSENTIAL BUILDING BLOCK IN DESIGNING THE FUTURE 2* (2016), <https://www.reedsmith.com/files/Publication/9ac2cd3f-efdf-48a1-959d-bcf79f8f0d71/Presentation/PublicationAttachment/34219750-39fe-4f37-881c-9e4abf86e2fd/Beyond%20Bitcoin%20Whitepaper%20US.pdf> [<https://perma.cc/HE94-AVB2>]; Thompson, *supra* note 15 ("[I]f someone wanted to hack into a particular block in a blockchain, a hacker would not only need to hack into that specific block, but all of the proceeding blocks going back the entire history of that blockchain.").

¹⁸REED SMITH, *supra* note 17, at 4.

¹⁹This hypothetical is adapted from a similar example in Wadhwa & Bobkoff, *supra* note 11.

²⁰*Id.* (detailing how a "bank, brokerage, the stock exchange, and the company you're buying" are all involved in the transaction).

²¹*Id.*

²²*Id.*

²³*Id.*

²⁴*Id.*

²⁵*Id.*

²⁶*Id.*; REED SMITH, *supra* note 17, at 2.

in the ledger.²⁷ The end result would be a complete, verified record of the stock purchase transaction and all of its attendant parts.²⁸ Each of the entities involved would have access to this cohesive record.²⁹ If the investor later decided to sell the stock, all details of that transaction would be added to the blockchain as well.³⁰

B. Overstock's Blockchain-Based Securities Offering

Overstock is an online retailer headquartered in Salt Lake City, Utah.³¹ When it launched in 1999, Overstock's original mission was "to be the premier company to sell excess inventory through the Internet."³² A wave of bankruptcies among online retailers in the early 2000s opened the door for Overstock to purchase "large quantities of inventory at cut-rate prices" and re-sell the surplus to customers at below-market prices.³³ Since going public in 2002,³⁴ the company has developed into a major force among online retailers: in 2016, Overstock's annual sales reached \$1.65 billion, second among online-only U.S. retailers.³⁵ Though the company is still known primarily as

²⁷ Wadhwa & Bobkoff, *supra* note 11; *see also* FINRA, DISTRIBUTED LEDGER TECHNOLOGY: IMPLICATIONS OF BLOCKCHAIN FOR THE SECURITIES INDUSTRY 3 (2017), https://www.finra.org/sites/default/files/FINRA_Blockchain_Report.pdf [<https://perma.cc/PJ7J-AL9H>].

²⁸ FINRA, *supra* note 27, at 3 ("Once a transaction is verified, the information is 'cryptographically hashed' and permanently recorded on the [distributed ledger technology] network. The records are time stamped and displayed in a sequential manner . . .").

²⁹ *Id.*

³⁰ Wadhwa & Bobkoff, *supra* note 11.

³¹ *Company Information*, OVERSTOCK, <https://www.overstock.com/about?TID=ABOUT:Info> [<https://perma.cc/KS7R-FFH3>].

³² *Our History*, OVERSTOCK, <https://www.overstock.com/our-history?TID=ABOUT:History> [<https://perma.cc/PJ3A-XGZD>].

³³ Joanna Glasner, *Where the Dot-Dead Wind Up*, WIRED (Nov. 12, 2001), <http://archive.wired.com/techbiz/media/news/2001/11/48189> [<https://perma.cc/8TXP-WCQX>] (listing failed retailers from which Overstock purchased inventory for resale).

³⁴ Steve Gelsi, *Overstock.com IPO Debuts*, MKT. WATCH (May 30, 2002), <http://www.marketwatch.com/story/overstockcom-ipo-ends-flat> [<https://perma.cc/62DJ-MRPX>].

³⁵ Arthur Zaczekiewicz, *Amazon, Wal-Mart Lead Top 25 E-commerce Retail List*, WWD (Mar. 7, 2016), <http://wwd.com/business-news/financial/ama->

an online liquidator, Overstock's operations have expanded in recent years to a variety of markets including international business and cars.³⁶

Overstock's blockchain activity stretches back to January 2014, when the company "became the first large retailer to accept bitcoin payments."³⁷ Later in 2014, Overstock formed a subsidiary called Medici, Inc. (Medici), to manage investments in firms using blockchain technologies.³⁸ Over the past three years, Medici's portfolio has grown to include blockchain operations in the United States,³⁹ Latin America,⁴⁰ the Caribbean,⁴¹ and Europe.⁴² In addition to its management

zon-walmart-top-ecommerce-retailers-10383750/ [https://perma.cc/3B5Q-A5K4].

³⁶ *Our History*, *supra* note 32.

³⁷ David Floyd, *Overstock's t0: Reconciling Fiat Currency and the Bitcoin Blockchain*, NASDAQ (Dec. 16, 2015), <http://www.nasdaq.com/article/overstock-t0-reconciling-fiat-currency-and-the-bitcoin-blockchain-cm555617> [https://perma.cc/4GB6-87NT?type=image]. Blockchain technology was originally created to support bitcoin, an alternative digital currency. Steve Wilson, *How it Works: Bitcoin Explained in 500 Words*, ZDNET (Feb. 15, 2017), <http://www.zdnet.com/article/blockchain-explained-in-500-words/> [https://perma.cc/E6R4-9GDJ].

³⁸ Press Release, Overstock.com, *Blockchain Pioneer Medici Ventures Invests in Factom, Inc.* (Feb. 7, 2017), <http://investors.overstock.com/phoenix.zhtml?c=131091&p=irol-newsArticle&ID=2243816> [https://perma.cc/42CU-9J2J].

³⁹ *See, e.g.,* Pete Rizzo, *Overstock Invests \$5 Million in Peernova in First Bitcoin Investment*, COINDESK (Mar. 31, 2015), <http://www.coindesk.com/overstock-venture-capital-investment-bitcoin-peernova/> [https://perma.cc/RQZ8-VTM9] (detailing Medici's investment in Silicon Valley-based Peernova).

⁴⁰ *See* Michael del Castillo, *Overstock Caps Series A for Bitcoin Startup Ripio With \$400k Funding*, COINDESK (Apr. 26, 2017), <http://www.coindesk.com/overstock-caps-series-bitcoin-startup-ripio-400k-funding/> [https://perma.cc/MT2Z-RBXF] (announcing Medici's investment in Ripio, an Argentina-based bitcoin exchange startup).

⁴¹ *See* Kevin Helms, *Patrick Byrne: t0 and Bitt Will Grow Under New Leadership*, BITCOIN.COM NEWS (Aug. 4, 2016), <https://news.bitcoin.com/patrick-byrne-grow-new-leadership/> [https://perma.cc/YL8F-U8XU] (identifying Bitt, a Caribbean blockchain startup, as one of Medici's investments).

⁴² *See* Stan Higgins, *Overstock Invests in Blockchain Voting Startup Settle-Mint*, COINDESK (Nov. 7, 2016), <http://www.coindesk.com/overstock-invests-blockchain-voting-startup/> [https://perma.cc/6QGN-EFD7] (reporting

activity, Medici developed its own trading platform for digital securities known as t0 (pronounced “tee-zero”).⁴³ According to the t0 website, the platform “integrates cryptographically secure distributed ledgers with existing market processes to reduce settlement time and costs [and] increase transparency, efficiency and auditability.”⁴⁴ The name “t0” refers to the fact that trades on the platform settle the same day they are initiated; trades on non-blockchain platforms ordinarily take three days (t+3) to settle.⁴⁵ Overstock’s CEO Patrick Byrne asserts that t0 can handle twenty to thirty thousand transactions per second—enough to support a fully functioning capital market.⁴⁶ As a “private blockchain,” t0 is accessible only to “known, trusted parties.”⁴⁷ The platform publishes all ledger entries to a publicly accessible blockchain, however, in order to promote transparency.⁴⁸

In June 2015, Overstock tested its platform in earnest when it offered bonds on t0 for the first time.⁴⁹ After the company issued \$25 million in bonds,⁵⁰ Overstock declared the beginning of the “cryptorevolution” on Wall Street.⁵¹ Overstock viewed the bond offering as a proof of concept demonstrating that “cryptotechnology can facilitate transparent and secure access to capital by emerging companies.”⁵²

that Medici invested in SettleMint, a Belgian blockchain startup).

⁴³ See Floyd, *supra* note 37.

⁴⁴ T0, <https://www.t0.com> [<https://perma.cc/H2KT-23YL>].

⁴⁵ Floyd, *supra* note 37.

⁴⁶ Rob Marvin, *Overstock CEO Patrick Byrne Talks Blockchain and Making History with t0*, PCMAG (Dec. 22, 2016), <http://www.pcmag.com/article/350253/overstock-ceo-patrick-byrne-talks-blockchain-and-making-hist> [<https://perma.cc/VL9P-9C4J?type=image>] (comparing t0’s capabilities to those of Visa and MasterCard).

⁴⁷ *Id.*; FINRA, *supra* note 27, at 3.

⁴⁸ Marvin, *supra* note 46.

⁴⁹ Press Release, Overstock.com, Overstock.com Launches Offering of World’s First Cryptosecurity (June 5, 2015), <http://investors.overstock.com/phoenix.zhtml?c=131091&p=irol-newsArticle&ID=2056957> [<https://perma.cc/QR9M-ZSTF>] [hereinafter Press Release] (“Overstock.com, Inc. . . . became the first company to solicit qualified institutional buyers in a digital corporate bond which will trade using the same technology that underlies cryptocurrencies such as a bitcoin.”).

⁵⁰ Floyd, *supra* note 37.

⁵¹ Press Release, *supra* note 49.

⁵² *Id.*

Around the same time as the bond offering, Overstock was working on yet another blockchain initiative.⁵³ On April 24, 2015, the company unveiled its most ambitious project yet when it filed a Form S-3 with the SEC in an attempt to register digital securities on the t0 platform.⁵⁴ Overstock worked closely with the SEC throughout the registration process,⁵⁵ and after several amendments,⁵⁶ the SEC approved the filing⁵⁷ and issued a notice of effectiveness on December 9, 2015.⁵⁸ The SEC gave Overstock the green light to issue up to \$500 million worth of securities and to determine the number of shares that would be issued as digital securities.⁵⁹ Having cleared this regulatory hurdle, Overstock announced its intention to complete the world's first public offering using blockchain technology in March 2016.⁶⁰

⁵³ See Overstock.com, Inc., Registration Statement (Form S-3) (Apr. 24, 2015).

⁵⁴ See *id.*

⁵⁵ As CEO Patrick Byrne explained, "This would've been a lot easier to do if we skirted the U.S. regulatory system but we've had dozens of meetings with the SEC and FINRA. We're in constant communication with them. We've addressed every challenge and objection. I think that's the way to do it." Marvin, *supra* note 46.

⁵⁶ Overstock submitted several amended filings. See Overstock.com, Inc., Registration Statement (Form S-3/A) (June 15, 2015) (amending the original filing); Overstock.com, Inc., Registration Statement (Form S-3/A) (July 31, 2015) (amending the filing further); Overstock.com, Inc., Registration Statement (Form S-3/A) (Oct. 9, 2015) (amending the filing further); Overstock.com, Inc., Registration Statement (Form S-3/A) (Nov. 12, 2015) (amending the filing further).

⁵⁷ Jacob Donnelly, *SEC Approves Overstock.com S-3 Filing to Issue Shares Using Bitcoin Blockchain*, BITCOIN MAG. (Dec. 7, 2015), <https://bitcoinmagazine.com/articles/sec-approves-overstock-com-s-filing-to-issue-shares-using-bitcoin-blockchain-1449539558/> [<https://perma.cc/55QZ-HEH5>].

⁵⁸ Overstock.com, Inc., Notice of Effectiveness, SEC File No. 333-203607 (Dec. 9, 2015), https://www.sec.gov/Archives/edgar/data/1130713/999999999515003225/xslEFFEFFECTX01/primary_doc.xml [<https://perma.cc/4B6X-BSV3>].

⁵⁹ Overstock.com, Inc., Registration Statement (Form S-3/A) (Nov. 12, 2015).

⁶⁰ Richard Kastelein, *Overstock.com Announces Historic Blockchain Public Offering*, BLOCKCHAIN NEWS (Mar. 17, 2016), <http://www.the-blockchain.com/2016/03/17/overstock-com-announces-historic-blockchain-public-offering/> [<https://perma.cc/65VB-7XGT>].

1. The Offering

On December 15, 2016—several months after Overstock’s announcement—the company completed a \$10.9 million stock offering that included \$1.9 million worth of digital shares.⁶¹ While most shares came in traditional over-the-counter form, Overstock issued 126,565 Series A blockchain shares to fifty-five investors at \$15.68 per share.⁶² The digital shares trade exclusively on the t0 platform,⁶³ which traders can access at any time via the t0 website.⁶⁴

The first day of blockchain-based trading saw little activity,⁶⁵ but according to Byrne, the offering represented “the dawn of a whole new age.”⁶⁶ Since the offering, Byrne has focused on the larger implications of his company’s latest initiative.⁶⁷ “This offering is historic in that we have successfully issued public securities that exist only on a blockchain,” Byrne said.⁶⁸ “In doing so, we have demonstrated to the world that there is indeed a path toward applying blockchain technology to capital markets in a way that complies with regulatory requirements and is accessible and practical for both issuers and investors.”⁶⁹

2. Further Developments and the Future of the t0 Platform

Though Overstock’s offering in December 2016 generated considerable enthusiasm, Byrne viewed his company’s achievement as “largely symbolic.”⁷⁰ “We did one tiny offering on t0 by Wall Street

⁶¹ Zanki, *supra* note 1.

⁶² Michael del Castillo, *Overstock Just Closed its First Day of Blockchain Stock Trading*, COINDESK (Dec. 16, 2016, 10:48 PM), <http://www.coindesk.com/overstock-first-day-blockchain-stock-trading/> [<https://perma.cc/F2YF-T9XS>] (relaying the details of the offering).

⁶³ Zanki, *supra* note 1.

⁶⁴ See T0, *supra* note 44.

⁶⁵ See del Castillo, *supra* note 62 (“[A]ctivity on the t0 blockchain explorer was confined to the verification of two blockchain addresses . . .”).

⁶⁶ Marvin, *supra* note 46.

⁶⁷ See *infra* text accompanying notes 68–69 (quoting Byrne’s comments about the implications).

⁶⁸ Zanki, *supra* note 1.

⁶⁹ *Id.*

⁷⁰ Cade Metz, *Overstock Begins Trading Its Shares on the Bitcoin Blockchain*, WIRED (Dec. 15, 2016), <https://www.wired.com/2016/12/overstock-com-is->

standards,” he acknowledged.⁷¹ “We didn’t really need the money.”⁷² Instead, Overstock sought to solidify its position on the front lines of the blockchain revolution.⁷³ Since the offering, Overstock has reaffirmed its commitment to “leading the charge” toward a blockchain-driven future.⁷⁴ In January 2017, the company acquired the assets of Blue Ocean Financial Technology, a market data firm that compiles and delivers information about U.S. securities.⁷⁵ Overstock plans to use Blue Ocean’s assets to set up a new company that will deliver real-time market information about activity on the t0 platform.⁷⁶

Overstock’s end goal is to license t0 to other entities that want to participate in a blockchain exchange.⁷⁷ Ultimately, the company is not interested in building its own ecosystem, but in “integrat[ing] with existing players” in the finance world.⁷⁸ In October 2016, Overstock began working on a blockchain consortium called “Revolution 4.”⁷⁹ According to the consortium’s president, John Tabacco, Overstock will use Revolution 4 to share its technological and regulatory expertise to help small businesses, financial technology firms, and startups.⁸⁰ Overstock has not yet announced a formal launch date for the consortium, but Tabacco has indicated that several potential members have expressed interest.⁸¹ In the meantime, Overstock

sues-stock-via-bitcoin-blockchain/ [https://perma.cc/3V3A-5UW5] (describing the stock offering as a “Sputnik moment”).

⁷¹ Marvin, *supra* note 46.

⁷² *Id.*

⁷³ *See id.* (“Over the next decade there will be disruption as significant as the internet was for publishing, where blockchain is going to disrupt dozens of industries, one being capital markets and Wall Street.”).

⁷⁴ *See* Kastelein, *supra* note 60.

⁷⁵ Stan Higgins, *Overstock’s T0 Blockchain Platform Acquires Market Data Firm*, COINDESK (Jan. 18, 2017), <http://www.coindesk.com/overstocks-blockchain-platform-acquires-market-data-firm/> [https://perma.cc/TPE7-XTK2].

⁷⁶ *Id.*

⁷⁷ Marvin, *supra* note 46.

⁷⁸ *Id.*

⁷⁹ Pete Rizzo, *No R3: Overstock Plots Blockchain Consortium for ‘Everyone Else’*, COINDESK (Oct. 5, 2016), <http://www.coindesk.com/no-r3-overstock-plots-blockchain-consortium-for-everyone-else/> [https://perma.cc/EG9Y-TD8F].

⁸⁰ *Id.*

⁸¹ *Id.*

intends to continue developing its t0 platform.⁸² As Byrne put it, “[W]e’re not waiting around”⁸³

C. Impact on the Securities Industry

1. Advantages of Blockchain

Blockchain advocates assert that the new technology will facilitate greater efficiency in securities transactions.⁸⁴ Without blockchain, each of the entities involved in a given transaction must maintain its own private records.⁸⁵ Discrepancies between these records often cause errors in the post-trade settling and clearing processes, and delays in settlement times.⁸⁶ According to one study, up to 10 percent of securities trades contain errors that require manual reconciliation of disparate records before they can be settled.⁸⁷ Blockchain, however, “could eliminate some of the most common post-trade issues and errors, such as incorrect settlement instructions or incorrect account/order details.”⁸⁸ Because the technology requires each party to verify and confirm the details of each trade before the transaction is executed, it eliminates the need for post-trade reconciliation.⁸⁹ This is the technological innovation that enables the t0 platform to settle trades on the same day they are executed.⁹⁰ According to Goldman

⁸² Marvin, *supra* note 46.

⁸³ *Id.*

⁸⁴ Zanki, *supra* note 1.

⁸⁵ See Wadhwa & Bobkoff, *supra* note 11 (“Right now, your bank, brokerage, the stock exchange, and the company you’re buying all have separate private records of transactions. They can’t see each other’s ledgers.”).

⁸⁶ See Matt Turner, *A ‘Game Changer’ Technology on Wall Street Could Shake Up Stock Trading*, BUS. INSIDER (May 25, 2016), <http://www.businessinsider.com/goldman-sachs-blockchain-cash-equities-trading-2016-5?r=UK&IR=T> [<https://perma.cc/UC8F-LL9P>] (“[T]he execution portion of a stock trade is pretty simple. It is the clearing and settlement portion where it gets messy, and where blockchain could add value.”).

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ See *id.* (“If blockchain could be fully implemented across these parties, many of these attributes could be included in a smart contract, thus becoming a pre-trade requirement to execute an order rather than a downstream, post-trade check that requires multiple parties to agree.”).

⁹⁰ See Zanski, *supra* note 1 (indicating that t0 is capable of settling trades “nearly immediately”).

Sachs, these efficiencies could save \$2 billion in annual costs in the United States alone and more than \$6 billion globally.⁹¹

Supporters also claim that blockchain promotes transparency and security.⁹² First, parties involved in a trade can access every detail of the transaction history simply by referring back to earlier blocks in the chain.⁹³ Second, sophisticated cryptography prevents any party from tampering with past information.⁹⁴ Since no single party controls the blockchain, the chain is “less vulnerable” to a cyberattack than a ledger with a centralized control structure.⁹⁵ The fact that “the blockchain cannot be lost or corrupted by participants” means “counterparty risk in transactions is significantly reduced.”⁹⁶ Since the consensus model requires every party to confirm a transaction before it is finalized, the blockchain actually “gets more secure the more people you add.”⁹⁷

2. Limitations and Challenges

Despite the fanfare that blockchain has engendered over the past few years, some commentators believe the technology is incompatible with current market practices.⁹⁸ Capital markets analyst Larry Tabb warns that the use of blockchain to help automate securities processing will present “massive difficulties.”⁹⁹ First, a blockchain-based, real-time clearing environment would disrupt the common practice among institutional investors of allowing brokers to “lend

⁹¹ Turner, *supra* note 86.

⁹² See REED SMITH, *supra* note 17, at 1 (“Blockchain technology . . . provides a cryptographically secured ledger that can be examined by all authorized parties, but cannot be changed.”).

⁹³ *Id.* at 4.

⁹⁴ *Id.* at 1.

⁹⁵ *Id.* at 19. *But see infra* text accompanying notes 113–16.

⁹⁶ REED SMITH, *supra* note 17, at 19.

⁹⁷ Wadhwa & Bobkoff, *supra* note 11.

⁹⁸ See, e.g., Irrera, *supra* note 3 (identifying five reasons why blockchain will be less effective than advocates believe).

⁹⁹ *Id.*; see also Richard Lumb, *Downside of Bitcoin: A Ledger That Can't Be Corrected*, N.Y. TIMES: DEALBOOK (Sept. 9, 2016), https://www.nytimes.com/2016/09/10/business/dealbook/downside-of-virtual-currencies-a-ledger-that-cant-be-corrected.html?_r=0 [https://perma.cc/767H-LDAP] (“Blockchain’s immutability could eventually run at odds with existing regulations, too.”).

their ‘idle’ securities to investors that need to cover short positions.”¹⁰⁰ This practice depends on the t+3 settlement lag characteristic of the current system.¹⁰¹ Second, the increased transparency inherent in the blockchain design might drive away large investors who prefer to keep their positions under wraps to avoid revealing investment strategies.¹⁰² Third, a move to a blockchain regime would be problematic for post-trade service providers.¹⁰³ These providers “net and compress” all the trades that large brokers execute in one particular asset each day.¹⁰⁴ This practice of “netting” helps reduce clearing and settlement costs.¹⁰⁵ Tabb argues that a blockchain system in which every trade would need

¹⁰⁰ Irrera, *supra* note 3.

¹⁰¹ *See id.* (“When the investor who owns the loaned securities decides to sell them, the lending process needs to unwind, meaning that the securities must be returned to the investor’s account before the sale is settled. Since the current settlement is . . . T+3 in the U.S., the custodian or prime broker effectively has that amount of time to return the securities to the investor.”); *see also* JOSHUA M. LAVENDER, J.P. MORGAN, A BEST PRACTICE APPROACH FOR DESIGNING A SECURITIES LENDING PROGRAM 1 (2014), <https://www.jpmorgan.com/jpmpdf/1320642118995.pdf> [<https://perma.cc/4D7Y-KZRQ>] (“Securities lending is intended to compliment investment strategies and allow investors the ability to monetize the intrinsic lending value of idle securities.”).

¹⁰² *See* Ian Allison, *How Will Blockchains Cross the Clearing and Settlement Chasm?*, INT’L BUS. TIMES (Mar. 2, 2016), <http://www.ibtimes.co.uk/how-will-blockchain-overcome-apparently-insurmountable-problems-clearing-settlement-1546943> [<https://perma.cc/UZ29-QJQ9>] (“Large investors, hedge funds, activist investors, and especially takeover firms, do not want to let others know that they are accumulating positions”); Irrera, *supra* note 3 (“This would mean turning the currently anonymous market into a disclosed one, which Tabb believes would hurt liquidity.”).

¹⁰³ Irrera, *supra* note 3.

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*; *see also* Pamela L. Marcogliese & Marc B. Rotter, *Bitcoins and Blockchain – The Use of Distributed Ledger Technology for the Issuance of Digital Securities*, CLEARY GOTTLIEB (Jan. 4, 2016), <http://www.cleary-mawatch.com/2016/01/bitcoins-and-blockchain-the-use-of-distributed-ledger-technology-for-the-issuance-of-digital-securities/> [<https://perma.cc/C4TB-4WQW>] (“It is unclear if transactions in digital securities would be recorded on the blockchain on a gross or net basis, or how payments would be processed. In addition, the increased number of direct retail and institutional participants, rather than intermediaries that could consolidate and net a number of transactions, could substantially increase the number of wire transfers needed for settlement of trades until a netting mechanism develops.”).

to be settled instantly would force providers to process 2.9 million additional transactions every day.¹⁰⁶

The incompatibilities with current practices dovetail into another, more fundamental market challenge.¹⁰⁷ One of the most significant impediments to blockchain's progress in the securities industry is the private cost of development.¹⁰⁸ As one study posits, "achieving all of the potential benefits of a mutual distributed ledger is likely to be afflicted by the problem of 'excess inertia.'"¹⁰⁹ Excess inertia is "a market failure that arises when users are 'locked in' to existing practice and as a result private profit incentives are not strong enough for individual firms to adopt a more efficient standard or technology, even when adoption would reduce costs for the industry as a whole."¹¹⁰ Thus, even though many experts believe a fully functioning blockchain platform would revolutionize the industry as a whole, implementing the platform will require developers to prioritize long-term benefits for the industry over their own short-term economic interests.¹¹¹ While Overstock has already demonstrated its willingness

¹⁰⁶ Irrera, *supra* note 3; see also Michael Mainelli & Alistair Milne, *The Impact and Potential of Blockchain on the Securities Transaction Lifecycle* 28 (SWIFT Inst., Working Paper No. 2015-007, 2016), https://www.swiftinstitute.org/wp-content/uploads/2016/05/The-Impact-and-Potential-of-Blockchain-on-the-Securities-Transaction-Lifecycle_Mainelli-and-Milne-FINAL.pdf [<https://perma.cc/LT33-4XR4>] ("Delayed settlement is a design choice involving deep economic market structures, not least of which are leverage and liquidity. A shift to near real-time settlement . . . will bring costs as well as benefits.").

¹⁰⁷ See Mainelli & Milne, *supra* note 106, at 6.

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ *Id.*; see also Jacob Boersma & Jeroen Bulters, *Blockchain Technology: 9 Benefits & 7 Challenges*, DELOITTE, <https://www2.deloitte.com/nl/nl/pages/innovatie/artikelen/blockchain-technology-9-benefits-and-7-challenges.html> [<https://perma.cc/CXW4-PWMH>] ("Blockchain offers tremendous savings in transaction costs and time but the high initial capital costs could be a deterrent.").

¹¹¹ See Mainelli & Milne, *supra* note 106, at 6 (explaining how private development costs may prohibit large-scale implementation); Mike Gault, *Let's Be Honest About The Problems With Blockchain And Finance*, TECH CRUNCH (Feb. 3, 2016), <https://techcrunch.com/2016/02/03/lets-be-honest-about-the-problems-with-blockchain-and-finance/> [<https://perma.cc/MW9S-YFHS>] ("Banks already have a huge technology headache: keeping pace with the web of global regulations. . . . When so much energy and budget go to keep-

to invest in a new market infrastructure, a fully functioning blockchain system will require more participants and further development.¹¹²

Finally, some commentators have cautioned that blockchain technology may be less secure and more susceptible to cyberattack than popular belief would indicate.¹¹³ In June 2016, a hacker exploited security vulnerabilities in Ethereum, a blockchain-based investment fund, and stole \$53 million.¹¹⁴ Two months later, hackers struck Bitfinex, a digital currency exchange that used blockchain technology, and made off with more than \$60 million.¹¹⁵ In September 2016, the Financial Stability Oversight Council warned that the flaws in distributed ledger technology “might not become clear until [it is] ‘deployed at scale.’”¹¹⁶ Though proponents point to improvements in cryptographic security features to assuage vulnerability concerns,¹¹⁷ “one hiccup or outage could be devastating.”¹¹⁸

ing regulators off your back, it’s hard to justify diverting resources to a completely unrelated issue.”).

¹¹² See Mainelli & Milne, *supra* note 106, at 6 (“While . . . mutual distributed ledgers have considerable potential . . . a great deal remains to be done in order for this potential to be exploited.”).

¹¹³ E.g., Hannah Kuchler, *Cyber Attacks Raise Questions About Blockchain Security*, FIN. TIMES (Sept. 12, 2016), <https://www.ft.com/content/05b5efa4-7382-11e6-bf48-b372cdb1043a> [<https://perma.cc/38JS-6CHX>] (“A series of cyber attacks against digital currencies has left the financial services industry wondering whether new blockchain technology can be made secure enough from criminals.”).

¹¹⁴ Mary-Ann Russon, *The Curious Tale of Ethereum: How a Hacker Stole \$53m in Digital Currency and Could Legally Keep It*, INT’L BUS. TIMES (June 20, 2016), <http://www.ibtimes.co.uk/curious-tale-ethereum-how-hacker-stole-53m-digital-currency-could-legally-keep-it-1566524> [<https://perma.cc/AKG4-7CRU>].

¹¹⁵ Stan Higgins, *The Bitfinex Bitcoin Hack: What We Know (And Don’t Know)*, COINDESK (Aug. 3, 2016), <http://www.coindesk.com/bitfinex-bitcoin-hack-know-dont-know/> [<https://perma.cc/D2DF-ZTSW>].

¹¹⁶ Kuchler, *supra* note 113.

¹¹⁷ See Chow, *supra* note 17; REED SMITH, *supra* note 17, at 2; Thompson, *supra* note 15.

¹¹⁸ Irrera, *supra* note 3; see also Boersma & Bulters, *supra* note 110 (“[T]here are still cyber security concerns that need to be addressed before the general public will entrust their personal data to a blockchain solution.”).

D. Legal and Regulatory Environment

As the potential benefits of applying blockchain technology to capital markets have become increasingly apparent, legislators and regulators have begun embracing the prospect of a distributed ledger system.¹¹⁹ At the state level, Governor Jack Markell announced that Delaware would be “updating its legal and regulatory environment to encourage development of blockchain technology.”¹²⁰ Markell vowed that Delaware would “help lead the way in promoting blockchain technology and its growing role in digital commerce.”¹²¹ In May 2016, the state’s legal advisers began investigating whether Delaware’s corporate law needed clarifications in order to authorize distributed ledger shares.¹²² Like-minded legislators in Illinois and Hawaii have also begun promoting blockchain initiatives.¹²³

On the regulatory side, the SEC approved Overstock’s blockchain-based filing and permitted the company to proceed with the t0 offering.¹²⁴ The contours of a possible full-scale distributed ledger

¹¹⁹ See, e.g., Zanki, *supra* note 8 (exploring Delaware’s efforts to integrate blockchain into its laws).

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² *Id.*

¹²³ See Michael del Castillo, *Illinois Joins R3, Unveils Expansive Blockchain Support Plan*, COINDESK (Mar. 16, 2017), <http://www.coindesk.com/illinois-government-unveils-expansive-blockchain-industry-support-plan/> [<https://perma.cc/MV3W-NFKG>] (describing a “sweeping plan” by Illinois to implement blockchain solutions in various government agencies); Stan Higgins, *Illinois Legislator Calls for Blockchain Working Group*, COINDESK (Feb. 10, 2017), <http://www.coindesk.com/illinois-legislator-calls-blockchain-working-group/> [<https://perma.cc/J4U9-A4HZ>] (reporting on a draft resolution in the Illinois legislature that would create a working group dedicated to blockchain technology); Stan Higgins, *Two Blockchain Politicians Want to Explore Blockchain Tech for Tourism*, COINDESK (Feb. 3, 2017), <http://www.coindesk.com/lawmakers-hawaii-want-explore-blockchain-tourism/> [<https://perma.cc/8ZDD-UUVH>] (focusing on a proposed bill that would lead to the creation of a group dedicated to researching “the uses of an best practices regarding blockchain technology”).

¹²⁴ See Overstock.com, Inc., Notice of Effectiveness, SEC File No. 333-203607 (Dec. 9, 2015), https://www.sec.gov/Archives/edgar/data/1130713/999999999515003225/xs1EFFECTX01/primary_doc.xml [<https://perma.cc/4B6X-BSV3>].

market, however, are far from established.¹²⁵ The SEC is currently revamping its training programs and expanding its information and technology department to keep up with the rapidly evolving field.¹²⁶ In November 2016, the SEC formed a “Distributed Ledger Technology Working Group.”¹²⁷ This seventy-five member team works with outside consultants to explain blockchain technology to members in every division of the SEC.¹²⁸ The goal is to promote agency-wide awareness of the various ways in which distributed ledger technology could apply to transactions in securities.¹²⁹ Some insiders have speculated, however, that regulators will be reluctant to turn away from the regulations to which they have grown accustomed.¹³⁰ Though the exact regulatory response is uncertain, the overall enthusiasm for blockchain’s application to capital markets suggests the technology will influence the direction of the SEC in the months and years to come.¹³¹

E. Conclusion

Many commentators agree that blockchain technology offers an appealing, though underdeveloped, alternative to traditional securities markets.¹³² Leading advocates such as Overstock believe the technology will promote efficiency, transparency, and security.¹³³ Blockchain is still in its infancy, however, and its potential role in

¹²⁵ See Mainelli & Milne, *supra* note 106, at 37.

¹²⁶ Michael del Castillo, *Blockchain Won’t Just Change Regulation, It Could Reshape the SEC*, COINDESK (Nov. 15, 2016), <http://www.coindesk.com/blockchain-wont-just-change-regulation-change-sec/> [https://perma.cc/4TRN-4T7Z].

¹²⁷ Michael del Castillo, *How the SEC’s Blockchain Lead is Defining Future Regulation*, COINDESK (Nov. 17, 2016), <http://www.coindesk.com/what-secs-involvement-means-blockchain-distributed-ledger-bitcoin/> [https://perma.cc/K3FS-9SWR].

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ Del Castillo, *supra* note 126 (“Regulators . . . are feeling a lot more comfortable with the regulations they’ve put in place and as a result, are unlikely to turn around and give up that regulation.”) (internal quotations omitted).

¹³¹ See *id.* (“To face an increasingly complicated field of potential problems, financial regulators will need to embrace a new set of skills.”).

¹³² See *supra* Section A (providing an overview of the blockchain technology).

¹³³ See *supra* Sections C.1 (offering perspectives of leading blockchain advocates).

securities transactions is not yet clear.¹³⁴ Questions about blockchain's security features and its relationship with current market practices have led some skeptics to conclude that the technology will never supplant more traditional trading methods.¹³⁵ Yet, if Overstock's recent digital offering is any indication of what the future holds, blockchain could revolutionize the way in which securities are issued and traded.¹³⁶

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¹³⁴ See *supra* Sections C.2 (acknowledging limitations of the technology and the inability of regulators to keep apace).

¹³⁵ See *supra* notes 113–18 and accompanying text (addressing concerns over blockchain's security).

¹³⁶ See *supra* Section B.2 (describing Overstock's new initiatives under development).

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