

50886 FinTech, Digital Currency and Blockchains

Visiting Prof. David Yermack, New York University
16-19 and 23-26 July, 9:30 – 12:00

Overview

Recently Bloomberg summarized a new research report issued by McKinsey & Co:

Firing people won't be enough to save the world's biggest banks from technological and regulatory changes that have reshaped the industry - whole businesses must go, according to McKinsey & Co. Almost every bank will have to quash aspirations to be all things to all customers . . . Only three to five global full-service banks will survive, McKinsey said.

This course covers digital currencies, blockchains, and related topics in the FinTech area, perhaps the most significant innovation in the financial world since the advent of double-entry bookkeeping centuries ago. The technology appears to represent an existential challenge for major parts of the finance industry. It is now commonly suggested by experts such as McKinsey that commercial banks and stock exchanges may no longer exist, or may become much smaller, within the next 10 to 20 years, with increasing volumes of payments and exchange taking place on a peer to peer basis.

We will begin with a study of the nature of money and legacy payment and banking systems. We will then study the emergence of stateless, cloud-based digital currency systems since 2009. Further lectures will explore threats that blockchain technology poses to incumbent firms and their resulting attempts to co-opt the technology into existing business models. We survey related issues including hacking, “smart contracts,” governance, and emerging regulation.

Readings

In addition to the readings listed with each lecture, we will use a draft version of Narayanan et al., *Bitcoin and Cryptocurrency Technologies*. You should rely on this book as background reading for technical details. This textbook, a companion to the Princeton Coursera open on-line course in digital currency, can be downloaded at no cost in draft form at:

https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf

Evaluation

Evaluation will be based on a take-home exam consisting of essay questions based upon real-world FinTech problems and opportunities as covered by the news media.

Lecture topics

An approximate list of the course's lecture topics appears below. We may deviate from this schedule based upon factors including the pace of individual lectures and current developments in the FinTech marketplace.

16 Course introduction: payment systems

- July
- *The Economist*, 2015, "The Great Chain of Being Sure About Things" available at <https://www.economist.com/news/briefing/21677228-technology-behind-bitcoin-lets-people-who-do-not-know-or-trust-each-other-build-dependable>.
 - Narayanan et al, Preface pp 3-22.

Emergence of blockchains and digital currencies

- Haber and Stornetta, 1991, "How to Time-Stamp a Digital Document" in *Advances in Cryptology - CRYPTO' 90*, Lecture Notes in Computer Science 537, 437–455.
- Nakamoto, 2008, "Bitcoin: A Peer-to-Peer Electronic Cash System," available at <https://bitcoin.org/bitcoin.pdf>.
- Bohme et al, 2015, "Bitcoin: Economics, technology, and governance," *Journal of Economic Perspectives* 29, 213-238.

17 Public blockchains, mining, and consensus

- July
- Narayanan et al, Chapters 4 & 5.

Digital currency as a form of money

- Yermack, 1995, "Is Bitcoin a Real Currency? An Economic Appraisal" in David K.C. Lee ed., *The Handbook of Digital Currency* (Elsevier), 31-44.

18 Ethereum, Altcoins and ICOs

- July
- Narayanan et al, Chapters 8, 10.
 - Howell, Niessner, and Yermack, 2018, "Initial coin offerings: Financing growth with cryptocurrency sales."

Digital currency as an investable asset

19 Blockchain applications in the capital markets

- July
- Yermack. 2017, "Corporate Governance and Blockchains," *Review of Finance* 21, 7-31.

Smart contracts

- Szabo, "Formalizing and Securing Relationships on Public Networks" available at <http://ojphi.org/ojs/index.php/fm/article/view/548/469>.

23 Cryptocurrency custody, security, governance and dispute resolution

- July
- Swanson, 2016, "Code Is Not Law" available at <http://www.ofnumbers.com/2016/08/09/code-is-not-law/>.

24 Financial inclusion

- July
- Scott, 2016, "How Can Cryptocurrency and Blockchain Technology Play a Role in Building Social and Solidarity Finance?" United Nations Research Institute for Social Development. Available at <http://www.unrisd.org/brett-scott>.

- Regulatory and compliance issues, including RegTech, taxation, and money laundering
- Lantmäteriet, 2017, “The land registry in the blockchain.”
- 25
July Blockchains in the public sector
- UK Government Office for Science, 2016, “Distributed Ledger Technology: Beyond Blockchain,” available at <https://www.gov.uk/government/news/distributed-ledger-technology-beyond-block-chain>.
- Cyber security, fraud, and crime in the FinTech area
- Leising, 2017, “The Ether Thief,” Bloomberg Markets, June 13, available at <https://www.bloomberg.com/features/2017-the-ether-thief/>.
 - Foley, Karlsen, and Putnins, 2018, “Sex, drugs, and Bitcoin: How much illegal activity is financed through cryptocurrencies?”
- 26
July Central bank digital currency and other macroeconomic issues
- Dyson and Hodgson, 2016, “Digital Cash: Why Central Banks Should Start Issuing Electronic Money,” Positive Money, available at <http://positivemoney.org/publications/digital-cash/>.
 - Raskin and Yermack, 2017, Digital Currencies, Decentralized Ledgers, and the Future of Central Banking,” in Peter Conti-Brown and Rosa Lastra eds., *Research Handbook on Central Banking* (Edward Elgar).