

Econ 895/496.006

Blockchain Economics

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Objectives

Blockchain combines three technologies: (a) advanced encryption; (b) automated execution of transactions (i.e., “smart contracts”); and (c) decentralized ledger. It has been adopted in many areas of life—from fin-tech and real estate to other applications where people seek secure, fast, and accurate exchanges. Blockchain is expected to disrupt many markets similarly to how the Internet did over the past 30 years.

The purpose of this course is to take advantage of the blockchain revolution and become trailblazers for teaching students how to leverage this medium. You will have the opportunity to work and receive feedback and mentoring on your research or business project, including pitching to actual investors. This will result in increasing research and venture opportunities, and enhancing the value of your Mason diploma for your future career.

After successfully completing this course, you will be able to:

- Apply core economic concepts to analyze blockchain market disruptions
- Define the key economic problems that blockchain solves
- Assess the costs, benefits, and risks related to specific blockchain technologies
- Understand the institutional implications of decentralization, anonymity, and ledgers
- Elaborate on the future of blockchain technologies

During the course, we will also refresh some basic economics concepts as price, money, exchange, trade, and welfare.

Methodology

The course is based on readings (prior to class), discussions (in class), and project preparation (after class).

Your learning experience is based on three pillars:

- Focusing on core concepts rather than trendier aspects of the technology
- Relying on dynamic curricula based on cutting-edge research
- Guiding students to understand real industry needs

Office hours: Whenever needed—after classes, by phone, email, or appointment.

Technical requirements: Cell phones and laptops shut down unless otherwise specifically stated.

Evaluation of student’s performance

Grading will be on a curve (your performance relative to others in the class), and based on quizzes, class participation, and project presentations in accordance with the guidelines provided in class.

Course Outline

Law & Economics

Session #1: *The Economics of Blockchain—Framework; markets and hierarchies; entry barriers; transaction costs; boundaries of the firm*

Tapscott, D., Tapscott, A. (2016). *Blockchain Revolution*. Penguin, New York, NY. Chapter 3: Re-architecting the Firm: The Core and the Edges.

Williamson, O. E. (1981). The modern corporation: origins, evolution, attributes. *Journal of Economic Literature*, 19(4), 1537-1568.

Williamson, O. E. (1975). *Markets and Hierarchies*. New York, 2630.

Session #2: *Contracts—Verifiability and enforceability; moral hazard; smart contracts*

Hart, O. (1988). Incomplete Contracts and the Theory of the Firm. *Journal of Law, Economics, & Organization*, 4, 119.

Hart, O., Moore, J. (1988). Incomplete contracts and renegotiation. *Econometrica*, 755-785.

Governments may be big backers of the blockchain, *The Economist*, June 1, 2017. Available at: <https://www.economist.com/business/2017/06/01/governments-may-be-big-backers-of-the-blockchain>

Session #3: *Property Rights—Registries; DeSoto effect: collateralization and welfare*

Demsetz, H. (1967). Toward a theory of property rights. *American Economic Review*, 57(2):347–359.

De Soto, H. (2000). *The mystery of capital: Why capitalism triumphs in the West and fails everywhere else*. Basic Civitas Books.

George Gilder: Forget Cloud Computing, Blockchain is the Future
<https://www.youtube.com/watch?v=cidZRD3NzHg>

Session #4: *Sequential Exchanges and the Coase Theorem*

Arruñada, Benito (2018). Blockchain's Struggle to Deliver Impersonal Exchange. *Minnesota Journal of Law, Science & Technology*, 19: 55-105. Available at: https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=2903857

Arruñada, Benito, Giorgio Zananone, and Nuno M. Garoupa (2019). Property Rights in Sequential Exchange. *Journal of Law, Economics, and Organization*, 35 (forthcoming).

Arruñada, Benito (2017). Property as Sequential Exchange: The Forgotten Limits of Private Contract. *Journal of Institutional Economics*, 13(4), 753-83. Available at: https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=2879827

Arruñada, Benito (2017). How Should We Model Property? Thinking with My Critics. *Journal of Institutional Economics*, 13(4), 815-27. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2975965

Session #5: *Project Pitching 1—Focus on the economic problem to be solved*

Submit max three slides in PDF format two hours before class; file name: "Econ895-Lastname1-Lastname2-Lastname3-Pitch1.pdf"

Markets & Exchange

Session #6: *Markets and Price System*

Tapscott, D., Tapscott, A. (2016). *Blockchain Revolution*. Penguin, New York, NY. Chapter 2: Bootstrapping the Future: Seven Design Principles of the Blockchain Economy.

Hayek, F. A. (1945). The use of knowledge in society. *American Economic Review* 35(4), 519-530. Available at: <http://www.econlib.org/library/Essays/hykKnw1.html>

Hayek, Friedrich A. 2007. *The Road to Serfdom: Text and Documents—The Definitive Edition*. Chicago, IL: University Of Chicago Press; Ch. 7 & 8: Freedom to choose

Session #7: Money and Cryptocurrencies

Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press. Chapter 1: Introduction to Cryptography & Cryptocurrencies. Available at: <https://freedom-to-tinker.com/2016/02/09/the-princeton-bitcoin-textbook-is-now-freely-available/>. Video lecture: <https://youtu.be/fOMVZXLjKY0>

Roubinini, N. (October 2018). Testimony for the Hearing of the US Senate Committee on Banking, Housing and Community Affairs on “Exploring the Cryptocurrency and Blockchain Ecosystem.” Available at: <https://www.banking.senate.gov/imo/media/doc/Roubini%20Testimony%2010-11-18.pdf>

Mises, L. von. (1912). *The Theory of Money and Credit*. New Haven: Yale University Press, 1953.

Session #8: Fin-Tech—Risk, return, and hedge fund investing; ICOs and crowd-funding

Tapscott, D., Tapscott, A. (2016). *Blockchain Revolution*. Penguin, New York, NY. Chapter 3: Reinventing Financial Services.

Session #9: Reputation, Trust, and Compliance

Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press. Chapter 7: Community, Politics, and Regulation. Available at: <https://freedom-to-tinker.com/2016/02/09/the-princeton-bitcoin-textbook-is-now-freely-available/>. Video lecture: <https://youtu.be/IRbgZUGHn9g>

Session #10: Project Pitching 2—Focus on the technological challenges

Submit max three slides in PDF format two hours before class; file name: “Econ895-Lastname1-Lastname2-Lastname3-Pitch2.pdf”

Applications

Session #11: Intellectual Property, Identity, and Health

Tapscott, D., Tapscott, A. (2016). *Blockchain Revolution*. Penguin, New York, NY. Chapter 9: Freeing Culture on the Blockchain: Music to Our Ears.

Session #12: Global Supply-Chain and Transportation—4th industrial revolution

Tapscott, D., Tapscott, A. (2016). *Blockchain Revolution*. Penguin, New York, NY. Chapter 6: The Ledger of Things: Animating the Physical World.

Session #13: Information, Voting, and Public Choice

Tapscott, D., Tapscott, A. (2016). *Blockchain Revolution*. Penguin, New York, NY. Chapter 8: Rebuilding Government and Democracy.

Hayek, Friedrich A. 2007. *The Road to Serfdom: Text and Documents—The Definitive Edition*. Chicago, IL: University Of Chicago Press; Ch. 5 & 6: Planning & democracy

Session #14: Project Pitching 3—Focus on the business model; selection of top three projects

Submit max three slides in PDF format two hours before class; file name: “Econ895-Lastname1-Lastname2-Lastname3-Pitch3.pdf”

Session #15: Pitching to Investors—Shark tank with real investors

Submit max five slides in PDF format two hours before class; file name: “Econ895-Lastname1-Lastname2-Lastname3-InvestorDeck.pdf”