Blockchain & Money

Class 10

October 11, 2018
Class 10 Overview

• Readings and Study Questions

• Finance & Financial Institutions

• Finance & Regulation

• Finance & Technology

• Credit & Capital Markets

• Financial Sector Risk Management and Crises

• Financial Sector => Opportunities

• Conclusions
Class 10 (10/11): Study Questions

• What are the tradeoffs of centralized institutions and markets in the financial sector?

• Which challenges of the financial sector – periodic crises, concentrated risks, economic rents, legacy systems, processing risks, financial inclusion – might present opportunities for blockchain applications?

• How does blockchain technology fit within other trends – particularly with regard to technology - facing the financial sector in 2018?
Class 10 (10/11): Readings

• ‘Top financial services issues of 2018’ PwC Financial Services Institute

• ‘Sheila Bair on What Hasn’t Changed since the Great Recession’ New York Magazine

• ‘The Rise of Market Concentration and Rent Seeking in Financial Sector’ Zhang

Optional
• ‘Ten Years after the Crash, We are Living in a World it Brutally Remade’ New York Magazine
What is the Role of Finance?

Moving, Allocating & Pricing:

Money & Risk

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Financial Institutions

Intermediaries of Financial Assets and Liabilities

• Functions
  • Investments (aka. Store of Value)
  • Credit (aka. Borrowing Value)
  • Risk Transformation
  • Advice regarding Financial Assets and Liabilities

• Sectors
  • Commercial Banks & Credit Unions
  • Investment Banks & Brokerage Firms
  • Insurance Companies & Underwriters
  • Collective Investment Vehicles, Mutual Funds, Pension Funds & Annuities
  • Asset Managers & Financial Advisors
  • Exchanges, Clearinghouses & Settlement Organizations
Financial Markets

• Primary Markets

• Secondary Markets
  • Exchange Trading
  • Over the Counter

• Asset Management

• Market Infrastructure
Finance

Ledgers

Records Economic Activity and Financial Relationships
Records Transactions and Accounts

Payment & Settlement Systems

Method to Amend and Record Ledgers for Money & Financial Assets
Authorizing, Clearing and Recording Final Transfers of Value
Finance and Regulation

• Finance has long been subject to Public Policy Debates and Regulation
Public Policy Framework

- Financial Stability

- Protecting the Public

- Guarding Against Illicit Activity
Finance and Technology

• Finance has long been in a Symbiotic Relationship with Technology of its Time
Money

Salt Bars - Ethiopia
Image by Bertramz on Wikipedia. CC BY

Cowrie Shells - Nigeria
Image by Gary Todd in the public domain.

Tally Sticks - England
Image by Sandstein on Wikimedia. CC BY

Rai Stones - Yap
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Metal Money

Bronze Aes Rude - Rome
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Bronze Spade - China
Image by Mary Harrsch on flickr. License CC BY-NC-SA.

Bronze Yuan - China
Image by Scott Semans World Coins. CC BY.

Cooper Plate - Sweden
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Silver Dekadrachm - Greece
Image by Daderot on Wikimedia. CC 0.

Gold Aureus - Rome
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Paper Money

Jiaozi Promissory Note - China

5 Pound Note - England

Continental Note – U.S.

Private Bank Note – U.S.

Private Bank Note - Canada

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Fiat Currency

• Represented by Central Bank Liabilities & Commercial Bank Deposits

• Accepted for Taxes

• Legal Tender for All Debts Public & Private

• Relies upon System of Ledgers
Financial Ledgers

Proto Cuneiform
Uruk, ca 3000 B.C

Personal Ledger
George Washington
1747

IBM 360
1961

Cuneiform and George Washington’s Ledger are in the public domain.
Payment & Settlement Systems

Personal Check
Thomas Jefferson
1809

Western Union
Telegram
1873

Telex
1950s – 1970s

Check and telegram images are in the public domain.
Technologies of our Time Affecting Finance

AI & ML

Blockchain

Cloud

Open API

Biometrics

Chatbots

Mobile

RPA
Credit
Borrowing Money or Value with an Agreement to Repay in the Future

U.S. Private and Public Debt as a % of GDP annually

U.S. Total Credit Market - $67 Trillion

• Government
  • Federal $17.5 Trillion
  • State & Local $ 3.1

• Commercial $14.8

• Financial $16.1

• Household $15.4

• Source: Federal Reserve 2018 Q2 ‘Financial Accounts of the U.S.’
U.S. Bond Market


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Bond & Equity Markets as % of GDP

Source: SIFMA September 2018 Research
U.S. Bond Market

Source: SIFMA September 2018 Research

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U.S. Equity Market

**US Equity Issuers**
- Closely held corporates, 11%
- Publicly traded corporates, 69%
- Foreign, 20%

**US Equity Holders**
- Households and nonprofits, 39%
- Funds (mutual, closed end, ETFs), 30%
- Public and private retirement funds, 12%
- Federal, state & local government, 1%
- Insurance companies, 2%
- US Banks & Broker dealers, 1%
- Foreign, 15%

Source: Federal Reserve

Source: SIFMA September 2018 Research

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Financial Sector Risk Management

• Market - Price, Rate, Spread, Basis, Volatility
• Credit
• Underwriting
• Liquidity
• Funding
• Settlement
• Model - Correlation
• Operational & Cyber
• Legal & Compliance
• Reputational
• Systemic
Financial Sector Crises

- Latin American Debt Crisis – late 1970s
- Continental Illinois - 1984
- Black Monday – 1987
- Subprime Mortgage Crisis – 2008
- European Debt Crisis – 2009 -
2008 Financial Crisis

• Weak Underwriting & Predatory Lending => Subprime Mortgage Crisis & Housing Bubble
• Easy Credit & Financial Derivatives => Increased Leverage & Interconnectedness
• Poor Risk Management & Incentive Structures => Many Vulnerable Financial Institutions
• Multiple Failures => Systemic Loss of Funding & Liquidity => Contagion & Near Collapse in Highly Interconnected System
Financial Sector => Opportunities

- Legacy Customer Interface, Data, & Processing Systems
- Economic Rents
- Concentrated Risks
- Infrastructure Systems’ Costs & Counterparty Risks
- Periodic Crises and Instability
- Financial Inclusion

- Wide Acceptance and Adoption of New Tech
- Rapidly Expanding Customer Data

- Financial sector costs: $7 \frac{1}{2} \%$ of U.S. GDP
- Payment system costs: $\frac{1}{2} - 1 \%$ of Global GDP
Financial Sector Potential Use Cases

- **Payment Systems** - Cross border, Large interbank, & Retail
- **Central Bank Digital Currency & Private Sector Stable Value Tokens**
- **Secondary Market Trading** – Crypto-exchanges & custody
- **Venture Capital** - Crowdfunding through Initial Coin Offerings
- **Clearing, Settlement and Processing** – Securities & Derivatives
- **Trade Finance & Supply Chain** - Digitizing paper-based processes
- **Digital IDs and Data Reporting**
Class 11 (10/16): Study Questions

• How do decentralized blockchain applications affect the cost of verification and the cost of networking? How do blockchain applications affect market power?

• What might the economics and organization of the Internet - with its protocol layers and applications - tell us about the future of blockchain technology?

• What lessons should be drawn from crypto skeptics – Krugman, Stiglitz, Roubini, Gates, Buffett, Dimon, & others - about the economic potential for blockchain technology? What is an answer to the oft stated query: ‘what problem do cryptocurrencies solve?’
Class 11 (10/16): Readings

- ‘Why Bitcoin is and isn’t the Internet’ Ito
- ‘Some Simple Economics of the Blockchain’ Catalini and Glans
- ‘Transaction Costs and Tethers: Why I’m a Crypto Sceptic’ Krugman
- ’Billionaire Bill Gates once got bitcoin for a birthday gift – Here’s what he did with it’ CNBC
- ‘Dr. Doom’ Economist Nouriel Roubini Bearish on Everything Crypto’ Forbes

Additional

- ‘Exploring the Cryptocurrency and Blockchain Ecosystem’ Roubini

Optional

- ‘The Economic Limits of Bitcoin and the Blockchain’ Budish
- ‘Valuing Bitcoin and Ethereum with Metcalf’s Law’ Clearblocks
- ‘The Meaning of Decentralization’ Buterin
Conclusions

• Finance Serves helps Allocate & Price Money & Risk in the Economy

• Ledgers & Settlement Systems undergird the Financial System

• Finance has long lived Symbiotically with Regulation & Technology

• Credit & Capital Markets are Essential parts of Modern Economies

• Finance Manages but also Concentrates Risk Leading to Periodic Crises

• Finance’s Role, Ledgers & Challenges Present Opportunities for Blockchain Technology to be a Catalyst for Change