The Economics of FinTech, Lecture 1

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Outline

1. Introduction
2. Topics to be covered
3. Topics not to be covered

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Introduction

- FinTech is a new word. Even the spelling is not uniformly agreed.
- FinTech vs. Techfin.
- "FinTech takes the original financial system and improves its technology. Techfin is to rebuild the system with technology." Jack Ma from Alibaba, *South China Morning Post*, Dec 2, 2016.
- Neither IT issues nor philosophical issues will be discussed.
  - For example, we will not discuss how to build an efficient money transfer and payment system via mobile devices.
  - We will give an introduction to Solidity, the most popular Ethereum programming language. However, we will not teach web3.js, an Ethereum JavaScript API.
  - We will also not discuss why FinTech exists and whether FinTech is good or bad for the society.

Background

- FinTech = Quantitative Finance 2.0?
  - Interesting non-trivial academic research problems
  - Journal interests: Management Science, Review of Financial Studies, Digital Finance
  - Master and certificate programs in FinTech
  - Industrial jobs for students. See, e.g., the salary reports on CNBC on October 22, 2018, for blockchain jobs.

Background

- "Silicon Valley is coming. There are hundreds of startups with a lot of brains and money working on various alternatives to traditional banking (...) They are very good are educing the 'pain points' ..." — Jamie Dimon, Chairman and CEO, JP Morgan Chase, FY 2014.
- FinTech, Google search term trend.
- Global FinTech Financing Activity (2010-2018), Source: KPMG.
- Nasdaq launchers a KBW FinTech equities index, symbol, KFTX.
- FinTech even appeared in many political speeches. "Moreover, we shall encourage Hong Kong's financial enterprises to keep abreast of the time and participate in financial innovation (including financial technology, or FinTech) and green finance. " Manifesto of Carrie Lam, Chief Executive Election 2017, Hong Kong.

Brief History of Technology in Finance

- 1950: Modern day credit cards are introduced
- 1960: Quotron systems, delivering stock market quotes to an electronic screen
- 1967: ATM
- 1971: The Nasdaq
- 1983: Home banking service via telephone and TV
- 1991: E*Trade offered its trading services via America Online and Compuserve
- 1995: Wells Fargo was the first U.S. bank to add account services to its website

What is New?

- For the first time, the innovation is coming from outside the financial service industry and competes with incumbents on core lines of business, e.g. lending, payments, transfers, investment.
- The technology is enabling change. Social networks, big data, mobile accessibility, and new business models.
- Financial crisis and regulatory issues; profits from traditional financial services are shrinking.
- Consumers today may be more likely to trust Google with their finance than a bank with 200 years of history.
- Demographic shift. Ubiquity of mobile devices, shift in expectations of service and incomes.

FinTech and Frictions

- Lack of efficiency of the financial sector. The size of the US financial service industry is getting bigger. However, Philippon (2015, AER) find that the unit cost of intermediation is about as high today as it was at the turn of the 20th century.
- In particular, improvements in information technologies do not appear to have led to a significant decrease in the unit cost of intermediation up to year 2000.
- FinTech uses of technology and analytics, often through new business models, to lower frictions in financial services, e.g. unit processing costs, asymmetric information (credit scoring), agency conflicts (ETF's), trust, search costs (health insurance), latency, etc.
- "FinTech is ultimately about taking away frictions ... My overall conclusion was that fintech is likely to make a substantial contribution by removing frictions." May 2017, Larry Summers, former U.S. Treasury Secretary and former Harvard President.

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Six Topics to Be Discussed in This Course

- Blockchains: Basics and introduction to blockchain programming. Tools used: *applied cryptography, Solidity, the gambling's ruin problem*.
- Cryptocurrencies: Basics, investment, and designing stable coins. Tools used: *investment and derivatives*.
- P2P equity financing: How to design contracts suitable for a P2P equity financing platform with information asymmetry? Tools used: *contract theory*.
- Robo-advisors: How to get investor's risk aversion parameters automatically by asking simple questions, and how to get consistent answers to meet goals of investors? Tools used: *stochastic control, dynamic mean variance analysis*.
- Data privacy preservation: How to do econometrics based on the encrypted data while still preserving privacy? Tools used: *coding theory, statistical inference*.
- Crowd wisdom: How to elite truth from the crowd? Tools used: *prediction markets, Bayesian statistics*.

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Topics not to be covered

- Stand alone subjects
  - Algo/AI trading, high frequency trading
  - Machine learning
  - Text mining, natural language processing
  - Financial information service (e.g. credit scores, credit rating, Bloomberg)
  - Under-banked, micro financing
  - Insurance Tech
  - SME lending
- Areas of FinTech that are not within the expertise of the instructor
  - Transfer and payment
  - P2P lending
  - Invoice finance
  - Crowd funding (we only cover P2P equity financing)
  - Crowdsourcing (we only cover the wisdom of crowd)

Transfers and Payments

- Transfers by individuals and SMEs across boarders is a big business. For example, the cross board money transfer at Western Union alone was over $70 billion.
- Yet, it is slow, expensive (about 7% for sending $200).
- FinTech solutions:
  - aggregate individual transfers (e.g. Payoneer)
  - "cancel out" transfers through a P2P model (e.g. Transferwise)
  - create a safer alternative (e.g. blockchain technology)

P2P Lending

- One party (individual or firm) lends money to another party (individual or firm) directly (e.g. Lending Club).
- Experienced significant growth.
- Lending Club eclipsed $28 billion in loans to more than 1.5 million borrowers over the past 10 years, making it the largest P2P lender in the industry.
- Growth drivers: interest rate zero, banks' diminishing risk appetite, lower consumer default rates even during the financial crisis, availability of information, demographic shifts.

Invoice Finance

- Also known as accounts receivable financing.
- Business that sell on credit accumulate an asset named receivable (e.g. Fundera, Fundbox).
- While traditional factoring is complex and requires large volumes, new entrants allow for easy financing by connecting to existing accounting software, choosing which receivables to pledge.
- Long-term relationship is fostered by learning, leading to lower rates.

Crowd Funding

- Donation/reward based model (e.g. GoFundMe, Kickstarter)
- Equity based (e.g. Angellist, ICO, Hedge Funds)

Crowdsourcing

- The largest crowdsourcing is perhaps Wikipedia.
- Social investment networks (e.g. eToro) connects with other traders who discuss trading strategies and can also follow and mimic successful traders.
- Share trading algorithms, and invest using the best codes (e.g. Quantopian)
- Share knowledge (e.g. seeking alpha)
- Crowdsource forecasting, using the wisdom of the crowd to make better forecasts of futures prices and events (e.g. Tipranks, Estimize)

FinTech Potential Impacts

- Lower operating costs for household and small business.
- Lower cost of capital for household and small business.
- Improve risk sharing.
- Increase market participation.
- Change employment level/characteristics in the financial service industry.