



Foundations of FinTech Spring 2020

Undergraduate (UG)

Tuesdays and Thursdays

UG Mult. 80.001: 11:00 am- 12:15 pm

Classroom KMC 3-50

Professors:

Kathleen DeRose (kderose@stern.nyu.edu)

Hanna Halaburda (hhalabur@stern.nyu.edu)

Teaching Fellow: Yuhao Ding, yd1158@nyu.edu

Summer Yang: yy1661@nyu.edu

Note: If you need to email the Professors or the TF please use the above emails and include "UG Fintech" on the subject line of your email.

Pre-requisite: Foundations of Finance

Course Description:

"FinTech" refers to financial sector innovations involving technology-enabled business models that can facilitate disintermediation, revolutionize how existing firms create and deliver products and services, address privacy, regulatory and law-enforcement challenges, provide new gateways for entrepreneurship, and seed opportunities for inclusive growth.¹

¹ See: <http://www.stern.nyu.edu/programs-admissions/full-time-mba/academics/specializations/fintech>

FinTech is also the label for increasingly technological approaches to the main financial intermediation functions: payments, capital raising, remittances, managing uncertainty and risk, market price discovery, and mediating information asymmetry and incentives. In today's FinTech businesses, consumers bank via mobile apps integrated into social media, institutions trade electronically, and robo-advisers make decisions about investment portfolios.

This inter-departmental course provides an introduction to the emerging FinTech discipline. It is intended to be the starting point for Stern students who may take additional electives in the FinTech area, while also providing an overview of the area for students who intend to take only one FinTech course.

The course will study:

- How is financial innovation different than industrial innovation? How is financial innovation evolving? What are the light sides and dark sides of financial innovation?
- Will traditional financial intermediaries be able to adapt? Or will upstart FinTechs disrupt them, re-imagining business models just as Amazon reshaped book-selling and Uber transformed taxi-rides?
- What are the critical technology strategies and foundational technologies in FinTech? What are the core and novel sources of FinTech data, how are they managed? How is data visualization evolving? What are the primary FinTech data science methods and tools? How do they apply to real FinTech problems and questions today?
- How is FinTech reconfiguring financial services business models? What are the key disruption points? What determines success in FinTech?
- Where are the limits, risks, and broader policy and social implications of FinTech?

Grading:

30% Case study questions

15% from technology fundamentals (classes 3-13)

15 % from fintech case studies (classes 16-20)

35% Midterm: **March 24, in class. Note this is AFTER Spring Break**

35% Final Exam: TAKE HOME EXAM DUE TBD during exam period

10% + or - : Class attendance and participation. Note that class attendance is **required**.

Your grade will be adjusted up or down to reflect participation

*Assignments must be posted to NYU classes. No email submissions. PDFs only. Assignments are due before class. That means 10:45 am the day of class. Please check time deadlines carefully as no late submissions are accepted since we review answers in class. Grade curve is not final until end of semester. **There will be no makeup assignments.***

Course Readings:

Please see **both** the syllabus below and NYU Classes for required reading. Not all readings are posted in classes, and you may have to access the reading yourself or via a syllabus link. You are responsible for all the indicated readings regardless of their location. We've marked readings as essential and optional. Because fintech is evolving rapidly, we occasionally post additional readings or links to the NYU Classes site resources folder or via announcements.

Note on Case Studies:

This class includes several case studies. Cases are due before class by NYU classes. We review answers in class, and therefore do not accept late submissions. We also do not accept email submissions.

Case question write-ups should use analytical writing. Qualitative work requires strong logical reasoning. The following general outline is useful: hypothesis or research question/statement, data, evidence, argument (including rebutting the counter argument), limitations, and conclusions.

The Proprietary Fintech Cases and the group and individual exercises in the second half of the class prepare you for an applied understanding of Fintech in the real world. The case assignments are posted at the start of the semester. The proprietary cases arrive quickly after the midterm so please prepare yourself.

General Conduct and Behavior:

Students are expected to maintain and abide by the highest standards of professional conduct and behavior. Please familiarize yourself with Stern's Policy in Regard to *In-Class Behavior & Expectations* and the *NYU Disruptive Behavior Policy*.

In particular this means: (a) attendance is mandatory; participation is expected, (b) arrive on time for class, arriving late will affect your class participation grade, (c) no personal use of electronic devices in class (d) display your name cards at your seat so the instructor can get to know you, (e) there will be NO makeup assignments

Academic Integrity Above All:

Integrity is critical to the learning process and to all that we do here at NYU Stern. As members of our community, all students agree to abide by the NYU Stern Student Code of Conduct, which includes a commitment to: (a) Exercise integrity in all aspects of one's academic work including, but not limited to, the preparation and completion of exams, papers and all other course requirements by not engaging in any method or means that provides an unfair advantage. (b) Clearly acknowledge the work and efforts of others when submitting written work as one's own. Ideas, data, direct quotations (which should be designated with quotation marks), paraphrasing, creative expression, or any other incorporation of the work of others should be fully referenced. (c) Refrain from behaving in ways that knowingly support, assist, or in any way attempt to enable another person to engage in any violation of the Code of Conduct. Our support also includes reporting any observed violations of this Code of Conduct or other School and University policies that are deemed to adversely affect the NYU Stern community.

The entire Stern Student Code of Conduct applies to all students enrolled in Stern courses and can be found here:

To help ensure the integrity of our learning community, all assignments that you submit via the course's NYU Classes website will be routed through Turnitin, which will compare your submission to a database of prior submissions, current and archived Web pages, periodicals, journals, and publications. Your document will automatically become part of the Turnitin database.

Students with Disabilities:

If you have a qualified disability and will require academic accommodation of any kind during this course, you must notify the instructor at the beginning of the course (within the first week) and provide a letter from the Moses Center for Students with Disabilities (CSD) at Tel. (212) 998-4980 or www.nyu.edu/csd verifying your registration and outlining the accommodations the Center staff recommends. If you will need to take an exam at the CSD, you must submit a completed Exam Accommodations Form (EAF) to them at least one week prior to the scheduled exam time to be guaranteed the alternative venue.

Other:

We adhere to the Stern policies regarding any exceptions (religious etc.), which must be arranged the first week of class, subject to the conditions above. We do not give substitute or makeup assignments

Basic Course Structure:

Theory and History: Tech innovation in financial services (Week 1)
Basics of Fintech Tech, Methods, and Data: Blockchain and Machine Learning (Week 2-7)
Fintech Disruption: Venture Capital, Incumbents, and Startups Case Studies (Week 8-10)
Fintech Limits and Risk: Valuation and Unicorns, Regulations, cyber (Week 11-12)
Fintech Broader Implications: Financial inclusion, Behavioral fintech, AI/Surveillance (Week 13-14)

Class slides:

Posted in NYU classes

Overall sources with good fintech news listed below. You can usually get a free trial subscription:

CB Insights <https://www.cbinsights.com>

Pitchbook <https://pitchbook.com>

The Financial Times <https://www.ft.com>

Overall books (some of these are expensive, so they are optional):

This is the best book that explains how things actually work in the five financial functions: Randall E. Duran: *Financial Services Technology: Processes, Architecture, Solutions* <https://www.amazon.com/Financial-Services-Technology-Processes-Architecture/dp/9814780863>

The *Book Bye Bye Banks* (after the midterm) is available on Amazon for \$6.00 so we did not order it from the bookstore

Red Thread:

In the first class, we introduce the idea that technology transforms financial activities, potentially benefiting all participants. During the semester, we will follow a “red thread” about automating investment management.

Syllabus:

Week 1

1. Jan 28: KTD and HH: Course Introduction: The Fintech Opportunity

- *The Economist*, To Do With the Price of Fish, <http://www.economist.com/node/9149142>
- Bodie, Zvi, and Merton, Robert C. 1998. *A Conceptual Framework for Analyzing the Financial Environment*. https://www.researchgate.net/publication/228224831_A_Conceptual_Framework_f_or_Analyzing_the_Financial_Environment
- Citi GPS, 2016, *Digital Disruption: How FinTech Is Forcing Banking to a Tipping Point*, available at <https://www.privatebank.citibank.com/home/fresh-insight/citi-gps-digital-disruption.html>
- OPTIONAL READINGS
- Jensen, Robert. (2007). The Digital Provide: Information (Technology), Market Performance, and Welfare in the South Indian Fisheries Sector. *The Quarterly Journal of Economics*. Available at: <https://mmd4d.files.wordpress.com/2009/04/jensen-indian-fisheries.pdf>
- Philippon, Thomas. 2018. The Fintech Opportunity. NBER Working Paper. <http://pages.stern.nyu.edu/~tphilipp/papers/FinTech.pdf>

2. Jan 30: HH: Encryption and Information Security, part 1

- Panayotis Vryonis, Public-key cryptography for non-geeks. August 28, 2013. Available at <https://blog.vrypan.net/2013/08/28/public-key-cryptography-for-non-geeks>.
- The Mozilla Foundation, Encryption and Decryption. Last updated June 4, 2015. Available at https://developer.mozilla.org/en-US/docs/Archive/Security/Encryption_and_Decryption.
- The Mozilla Foundation, Introduction to Public-Key Cryptography. Last updated March 21, 2015. Available at https://developer.mozilla.org/en-US/docs/Archive/Security/Introduction_to_Public-Key_Cryptography.
- RECOMMENDED: watch the movie “The Imitation Game”

Week 2

3. Feb 4: HH: Encryption and Information Security, part 2

4. Feb 6: HH: Bitcoin Basics

- Michael Scott, The Essence of the Blockchain. Published 30 August 2016. Available at <http://www.miracl.com/hubfs/block.pdf?hsCtaTracking=41b86e7e-0bc6-48f0-889a-61bd43021a32%7Cab2522ad-e26f-4487-b0f3-b251481190c8>
- Chapter 2: Blockchain Technology, in Matteo Biela and Vittorio Zinetti, Blockchain

- Technology and Applications from a Financial Perspective. Available from NYU Classes.
- Guillaume Haeringer and Hanna Halaburda, Bitcoin: A Revolution? Published in Digital Economy 2018. Available on SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3133346 **Notice that even though SSRN suggests to create an account, you can download the papers anonymously—it is always a smaller button at the bottom of the page.**
 - WATCH: Scott Driscoll, How bitcoin works under the hood (22 minute video; July 14, 2013). Available, including transcript, at <http://www.imponderablethings.com/2013/07/how-bitcoin-works-under-hood.html>

Week 3

5. Feb 11: HH: Bitcoin Mechanics, Part 1

- Satoshi Nakamoto, 2008, *Bitcoin: A Peer-to-Peer Electronic Cash System*, unpublished, available at <https://bitcoin.org/bitcoin.pdf>
- Pierre Rochard, Bitcoin Governance: Why we care. Medium, July 8, 2018. Available at https://medium.com/@pierre_rochard/bitcoin-governance-37e86299470f
- Aaron van Wirdrum, A Primer on Bitcoin Governance, or Why Developers Aren't in Charge of the Protocol. Bitcoin Magazine, September 7, 2016. Available at <https://bitcoinmagazine.com/articles/a-primer-on-bitcoin-governance-or-why-developers-aren-t-in-charge-of-the-protocol-1473270427/>
- Max Gulker, Bitcoin: Decentralized Governance Put to the Test. Bitcoin and Blockchain Research Briefs, American Institute for Economic Research. Available at <https://www.aier.org/research/bitcoin-decentralized-governance-put-test>
- Hanna Halaburda, Digital Currencies: Beyond Bitcoin. Published in Communications and Strategies 2016, Available on SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2865004

6. Feb 13: HH: Bitcoin Mechanics, Part 2

Week 4

7. Feb 18: HH: Bitcoin Transactions and Smart Contracts

- Christopher Burniske, Bitcoin and Ethereum: How smart contracts work. ARK Research blog, May 29, 2016. Available at <https://ark-invest.com/research/smart-contracts-work>
- Hanna Halaburda and Miklos Sarvary, Crypto-currencies (Chapter 4 of book "Beyond Bitcoin" Palgrave 2016). Available on SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3135043

8. Feb 20: HH: Ethereum and Enterprise Applications of Blockchain

- Ethereum, a Virtual Currency, Enables Transactions That Rival Bitcoin's. *New York Times*, March 27, 2016. <https://www.nytimes.com/2016/03/28/business/dealbook/ethereum-a-virtual-currency-enables-transactions-that-rival-bitcoins.html>
- Gideon Greenspan, Ending the bitcoin vs. blockchain debate. Blog post July 20,

2015. Available at

<https://www.linkedin.com/pulse/ending-bitcoin-vs-blockchain-debate-gideon-greenspan>

- Blockchain Goes To Work At Walmart, Amazon, JPMorgan, Cargill and 46 Other Enterprise, *Forbes*, April 2019
<https://www.forbes.com/sites/michaeldelcastillo/2019/04/16/blockchain-goes-to-work/#4e5dd2922a40>
- Walmart is betting on blockchain to improve food safety, *TechCrunch*, September 2018 <https://techcrunch.com/2018/09/24/walmart-is-betting-on-the-blockchain-to-improve-food-safety/>
- Gian Volpicelli, Is Libra really a cryptocurrency? *Wired*, Aug 14, 2019
<https://www.wired.co.uk/article/facebook-libra-cryptocurrency-explained>
- Facebook wants to create a global currency, *The Economist*, Jun 22, 2019
<https://www.economist.com/leaders/2019/06/22/facebook-wants-to-create-a-global-currency>

Week 5

9. Feb 25: HH: Ripple vs. R3 Case Discussion

- Chapter 3: Financial Use Cases, in Matteo Biela and Vittorio Zinetti, *Blockchain Technology and Applications from a Financial Perspective*. February 26, 2016. Available from NYU Classes. Read 3.1: Payments; rest of chapter is optional reading.
- Sally Percy, What is the Cheapest Way to Send Money Abroad? *The Telegraph*, 7 April 2016
<http://www.telegraph.co.uk/money/transferwise/the-cheapest-way-to-send-money-abroad/>
- Read the Wikipedia articles on Ripple (the company, the payment protocol, and the coin—XRP) and do additional research as needed.
- Read the R3 Corda platform website (corda.net)
- Hanna Halaburda, Blockchain Revolution without the Blockchain. *Communications of ACM*, July 2018. Available on SSRN:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3133313
- Blockchain taxonomy from CB insights
<https://www.cbinsights.com/research/blockchain-trends-2019/>

- | |
|---|
| <ul style="list-style-type: none">• Prepare and Submit Ripple/R3 Case Questions: individual work, maximum 1-2 pages bullet point answers |
|---|

10. Feb 27: HH: Machine Learning, Part 1

Cameo: preview of Fintech startups

- Machine Learning for Humans (Part 1, Part 2.1, Part 2.2 pages 30-31, Part 2.3 pages 46-52), available at
<https://everythingcomputerscience.com/books/Machine%20Learning%20for%20Humans.pdf>
- OPTIONAL: Dhar, V., Data Science and Prediction, *Communications of the ACM*, volume 56, number 12, December 2013

- OPTIONAL: Dhar V., When to Trust Robots With Decisions and When Not To, Harvard Business Review, May 2016.
<https://hbr.org/2016/05/when-to-trust-robots-with-decisions-and-when-not-to>
- OPTIONAL: Provost, F., Predictive Modeling With Big Data: Is Bigger Really Better? Big Data, volume 1, issue 4, Jan 2014;
<http://online.liebertpub.com/doi/pdfplus/10.1089/big.2013.0037>

Week 6:

11. Mar 3: **HH: Machine Learning, Part 2**

- **Red Thread:** Kathleen DeRose and Christophe Le Lannou: *CFA Reading on Machine Learning in Investment Management*
- OPTIONAL: Provost and Fawcett, Data Science for Business, Chapter 3, Introduction to Predictive Modeling: From Correlation to Supervised Segmentation
- OPTIONAL: Provost and Fawcett, Data Science for Business, Chapter 5, Overfitting and its Avoidance

12. Mar 5: **HH: Technology, Network Effects and Platform Strategy**

- James Currier, The Network Effects Manual: 13 Different Network Effects (and counting). Medium, January 9, 2018. Available at <https://medium.com/@nfx/the-network-effects-manual-13-different-network-effects-and-counting-a3e07b23017d>
- Strategies for Two-Sided Markets. Thomas Eisenmann, Geoffrey Parker, and Marshall W. Van Alstyne. Harvard Business Review, October 2006. Available from NYU Classes.
- Hanna Halaburda and Felix Oberholzer-Gee, Limits to Scale, published in HBR April 2014, available at <https://hbr.org/2014/04/the-limits-of-scale>

Week 7:

13. Mar 10: **HH: Paypal Case & Data Privacy**

- PayPal Merchant Services. HBS Case 9-806-188. Available from NYU Classes
- Big data, financial services and privacy. The Economist, February 9, 2017. Available at <https://www.economist.com/news/finance-and-economics/21716621-should-our-bankers-and-insurers-be-our-facebook-friends-big-data-financial>
- How to think about data in 2019. The Economist, December 22, 2018. Available at <https://www.economist.com/leaders/2018/12/22/how-to-think-about-data-in-2019>
- Cybersecurity and Data Privacy in 2017: Eight Topics to Follow. By McGuireWoods LLP, January 31, 2017. Available at <http://www.jdsupra.com/legalnews/cybersecurity-and-data-privacy-in-2017-32602/>
- EU-U.S. Privacy Shield Fact Sheet. European Commission, July 2016. Available at http://ec.europa.eu/justice/data-protection/files/factsheets/factsheet_eu-us_privacy_shield_en.pdf
- WATCH: <https://www.youtube.com/watch?v=507wn9VcSAE>
- RECOMMENDED: watch the movie "Brexit: The Uncivil War"

- **Prepare and Submit PayPal Case Questions:** individual work, maximum 1-2 pages bullet point answers

14. Mar. 12: **HH: Midterm Review (in class)**

SPRING BREAK IS MARCH 16-20. PLEASE NOTE THAT THE MIDTERM REVIEW IS **BEFORE** THE BREAK AND THE MIDTERM EXAM IS **AFTER** THE BREAK.

Week 8

15. Mar. 24 : **HH: Midterm Exam (in class)**

16. Mar 26: **KTD: Disruptive Innovation & VC in Fintech**

- Christensen, Clayton M., and Bower, Joseph L. (1995). Disruptive Technologies: Catching the Wave. *Technology & Operations*. Harvard Business School.
- Christensen, Clayton M., Raynor, Michael E. and McDonald, Rory. (2015). What is Disruptive Innovation? *Harvard Business Review*. December 2015.
- Frame, W. Scott, and White, Lawrence J. (2014). Technological Change, Financial Innovation, and Diffusion in Banking. Chapter prepared for *The Oxford Handbook of Banking*, 2nd edition. Available at www.ssrn-id2380060.pdf
- Tufano & Lerner pros and cons of financial innovation: <https://www.nber.org/papers/w16780.pdf>
- **Venture Capital for Dummies** <https://www.amazon.com/Venture-Capital-Dummies-Nicole-Gravagna/dp/1118642236> (this book places more emphasis on entrepreneurs preparing to raise capital)
- Kerr, William R., Lerner, Josh, and Schoar, Antoinette. 2014. The Consequences of Entrepreneurial Finance: Evidence from Angel Financings. *Review of Financial Studies* 27, no.1. January: 20-55. Available at: www.hbs.edu/wkerr/KLS-Angels-Oct2011.pdf
- Sequoia Pitch Deck. Available at: <https://www.slideshare.net/PitchDeckCoach/sequoia-capital-pitchdecktemplate>
- OPTIONAL:
- Metrick, Andrew. (2007). **Venture Capital and the Finance of Innovation**. John Wiley & Sons. Chapters 1-4. *There are multiple editions of this book.* (This book places more emphasis on venture capital finance and later chapters go into depth about options valuation. It's expensive but it is also a great reference). Also, Metrick's website provides great resources: <http://faculty.som.yale.edu/andrewmetrick/index.html>

17. Mar. 31: **HH & KTD: Midterm Exam return and review, Mapping Fintech Disruption**

The first half of the class we review the midterm. The second half of the class we review case method. We will do an in-class group exercise; groups will be posted in advance

- Haycock, James, and Richmond, Shane. (2015). *Bye Bye Banks? How retail banks are being displaced, diminished, and disintermediated by tech startups-and what they can do to survive*. London, U.K. Wunderkammer, Adaptive Lab
- Allayannis & Cartwright. 2017. Darden Case Study: Cutting Through the Fog: Finding a Future with Fintech.

18. Apr. 2 Payments and Money Transfers: Pirate Booty/Loot

- **Pirate Booty Case** (on NYU classes)

- LTV: CAC: <https://medium.com/gringottswizardingventures/the-ultimate-guide-to-vcs-ltv-cac-analysis-c74019ad72af>
- OPTIONAL:
- *Payments Systems in the U.S.*: <https://www.amazon.com/Payments-Systems-U-S-Third-Professional/dp/0982789742>

- **Prepare and Submit Case Questions:** individual work, maximum 1-2 pages total bullet point answers

- Would you invest in Pirate Booty? Why or why not?
- Pirate Booty "outsourced" much of their tech stack. Why?
- Pirate Booty chose not to obtain a banking license. Why?
- In your view, what is the most overly optimistic assumption in Pirate Booty's 5-year financial forecast. The most conservative one? Why?

Week 10

19. Apr. 7: **KTD: Markets and Price Discovery: Trumid**

- **Trumid Case** (on NYU classes)
- **Red Thread:** Financial Times. Dec. 23, 2019. *Machine Learning: the big risks and how to manage them.* <https://www.ft.com/content/90ac19fe-2008-11ea-92da-f0c92e957a96>
- Flextrade Blog. 2018. *Electronic Bond Trading at the Crossroads:*
- <https://flextrade.com/electronic-corporate-bond-trading-crossroads/>
- Bloomberg. 2018. *Electronic Bond Trading Gains Ground*
- <https://www.bloomberg.com/news/articles/2018-02-15/electronic-bond-trading-gains-ground-as-market-finally-matures>

- **Prepare and Submit Case Questions:** individual work, maximum 1-2 pages bullet point answers (this case is ungraded)

- Who are Trumid's main competitors, and what is the source of Trumid's competitive advantage versus these competitors?
- Will Trumid make corporate bond markets trading more efficient? Please indicate how you would determine this.
- How did Trumid induce dealers to join the platform?
- What is Trumid's SOM?

20. Apr. 9: **KTD: Wealthtech: Betterment**

- **Betterment Case** (on NYU classes)
Investment Company Institute. 2018. *Factbook: Industry Research.* This is the investment management industry-lobbying group. However, they have good material on the long-term industry trends. To familiarize yourself with these look at the sections under research.
- https://www.ici.org/pdf/2018_factbook.pdf
- **Red Thread:** Lauren Cohen. 2019. *Lazy Prices.* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1658471
- **Red Thread:** JPMorgan: *Big Data and AI Strategies: Machine Learning and Alternative Data Approaches to Investing*
- DIY stock indices pose challenge to investment heavyweights. *Financial Times.* December 5, 2019.

- <https://www.ft.com/content/4a5d77de-1786-11ea-9ee4-11f260415385>
- Wigglesworth, Robin. 2020. *Active Fund Managers pray for turnaround as exodus continues*: <https://www.ft.com/content/c35e416e-2045-11ea-b8a1-584213ee7b2b>
- Bessembinder et al articles on whether stocks outperform Treasury Bills, and the contribution of a few stocks to global index returns referred to in Wigglesworth piece:
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2900447
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3415739
- Michael Kitces on the tension between advisor software and incumbent platforms:
- <https://www.kitces.com/blog/financial-advisor-platform-fintech-app-store-best-in-class/>
- Fein, Melanie. 2015. *Robo-Advisors: A Closer Look*. (Paper against robo-advice prepared for incumbent Federated Investors). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2658701
- Tertilt & Scholz. 2017. *To Advise, or Not to Advise-How Robo-Advisors Evaluate the Risk Preferences of Private Investors*. Abstract available at SSRN, entire article requires subscription. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2913178
- OPTIONAL: Sironi, Paolo. 2016. *FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification*. United Kingdom. Wiley & Sons.

• **Prepare and Submit Case Questions:** individual work, maximum 1-2 pages bullet point answers

- Should Betterment enter the retirement market? Why or why not?
- Did Betterment's tech stack hinder or help its growth?
- Is Betterment a platform?
- How does Betterment customize its customer service to reflect behavioral biases in investing?

Week 11

21. Apr. 14 **KTD: FinTech Valuation: Tech or Fin and Lending Club**

- Damodaran, Aswath. *The Dark Side of Valuation* Damodaran, Aswath. *The Dark Side of Valuation*. <http://people.stern.nyu.edu/adamodar/pdfiles/country/darkside.pdf>
- Corkery, Michael. 2016. *As Lending Club Stumbles, Its Entire Industry Faces Skepticism*. *The New York Times*. Deal Book. May 9. Available at: <http://www.nytimes.com/2016/05/10/business/dealbook/as-lending-club-stumbles-its-entire-industry-faces-skepticism.html>
- Largest M&A deals in fintech <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/50076393>
- Wilcox, Jarrod, and Phillips, Thomas. 2004. *The PB/ROE Model Revisited*. Slide Deck via Northfield Information Services available at: <http://www.northinfo.com/documents/29.pdf>
- Balyuk & Davydenko. 2018. *Reintermediation in Fintech: Evidence from Online Lending*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3189236

22. Apr. 16: KTD: Fintech Valuation: Unicorns, (con't).

- SHORT: Stanford Business Journal article about Gornall and Strebalev, available at: <https://www.gsb.stanford.edu/insights/silicon-valleys-unicorns-are-overvalued>
- Softbank vision fund. *The Financial Times*. <https://www.ft.com/content/768cb782-c33c-11e9-a8e9-296ca66511c9>
- LONG: Gornall, Will and Strebalev, Ilya. 2017. *Squaring Venture Capital Valuations with Reality*. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2955455

Week 12

23. Apr. 21: KTD (Guest Speaker): Fintech Regulations

- Robinhood concerns: <http://fortune.com/2018/12/16/robinhood-checking-savings-regulatory-concerns/>
- UN piece on why sandboxes don't work for inclusion
- https://www.unsgsa.org/files/2915/5016/4448/Early_Lessons_on_Regulatory_Innovati ons_to_Enable_Inclusive_FinTech.pdf
- Leising, Matthew. 2017. The Ether Thief. *Bloomberg Markets*. Available at: <https://www.bloomberg.com/features/2017-the-ether-thief/>
- Mesropyan, Elsa. 2016 "International FinTech Regulatory Sandboxes Launched by Forward-Thinking Financial Authorities," *Let's Talk Payments*, available at <https://letstalkpayments.com/international-fintech-regulatory-sandboxes-launched-by-forward-thinking-financial-authorities/ /dealbook/silicon-valley-tried-to-upend-banks-now-it-works-with-them.html>
- Milanovic, Nik. 2017. An Obscure Regulatory Debate Has Put The Entire U.S. Fintech Community On Edge. Available at: <https://techcrunch.com/2017/04/24/an-obscure-regulatory-debate-has-put-the-entire-u-s-fintech-community-on-edge/>
- Popper, Nathaniel. 2017. "Silicon Valley Tried to Upend Banks. Now it Works with Them," *The New York Times*, February 22, available at <https://www.nytimes.com/2017/02/22/business/dealbook/silicon-valley-tried-to-upend-banks-now-it-works-with-them.html>
- The FCA's Global Fintech Sandbox
- <https://www.fca.org.uk/firms/regulatory-sandbox/global-sandbox>
- Here's What China's Regulatory Reshuffle Could Mean for Fintech. *Business Insider*. 2018. <http://www.businessinsider.com/heres-what-chinas-regulatory-reshuffle-could-mean-for-fintech-2018-3>
- Wang, Wei and Dollar, David. 2018. What's Happening with China's Fintech Industry? <https://www.brookings.edu/blog/order-from-chaos/2018/02/08/whats-happening-with-chinas-fintech-industry/>
- McNulty, Lucy. 2017. 10 RegTech Firms to Watch. *Financial News*. <https://www.fnlondon.com/articles/the-10-regtech-firms-to-watch-20170530>

24. Apr. 23: KTD: Financial Exclusion and Inclusion: Digital India

- World Bank, 2014, *Global Financial Development Report: Financial Inclusion*. Available at: <http://siteresources.worldbank.org/EXTGLOBALFINREPORT/Resources/8816096-1361888425203/9062080-1364927957721/GFDR-2014-Complete-Report.pdf>.
- Bose, Abhijit. 2017. India's Fintech Revolution is Primed to Put Banks Out of Business. Available at: <https://techcrunch.com/2016/06/14/indias-fintech-revolution-is-primed-to-put-banks-out-of-business/>
- Sachdeva, Rishabh. 2017. India's Demonetization Experiment. *Medium*. Available at: <https://medium.com/hello-gs/indias-demonetisation-experiment-cc5e15dd1d1d>
- Digital India: www.digitalindia.gov.in
- Chakravorti, Bhaskar. 2017. *Early Lessons from India's Demonetization Experiment*. HBR. <https://hbr.org/2017/03/early-lessons-from-indias-demonetization-experiment>
- Blood and Soil in Narendra Modi's India. 2019. *The New Yorker*. <https://www.newyorker.com/magazine/2019/12/09/blood-and-soil-in-narendra-modis-india>

Week 13

25. Apr. 28: **KTD Behavioral Fintech**

- **Red Thread:** Cassidy, Daniel. 2006. Vanguard Group. *Lessons from Behavioral Finance and the Autopilot 401-K Plan*. (PDF in NYU Classes).
- Commonwealth's work on "prize-linked" savings:
- <https://buildcommonwealth.org/work/prize-linked-savings>
- Lee, Sung K. 2019. *Fintech Nudges: Overspending Messages and Personal Finance Management* (PDF in NYU Classes)
- Thaler, Richard H. 2015. *Misbehaving, The Making of Behavioral Economics*. New York/London. W.W. Norton.

26. Apr.30 **KTD Visualization in Fintech Special Guest: Prof. Kirsten Sosulski**

You will prepare a fintech visualization, designing one simple UX or UI screen, shared via googledocs, instructions will be posted on Classes

- **Red Thread:** *Applying AI in Wealth Management: Compelling Use Cases Across the Client Life Cycle*. Ernst and Young and Finantix. PDF.
- Video: Kathleen DeRose on visualization in fintech
- www.gbksoft.com Top Data Visualization tools
- How VR and AR will shape the future of fintech, Oct. 31, 2018 at www.hackernoon.com
- The Practical Guide to Designing Great Fintech Apps: July 2018 at www.uxplanet.com
- See *CB Insights* for "worst" visualizations

Week 14

27. May 5: **KTD "Autonomous Finance" Risk: cyber, operational, latency risks**

Please read about the Bangladeshi Bank Heist, and about Herstatt risk. Please read about one of the other "risk" topics below

Bangladeshi Bank Heist:

- Zetter, Kim. 2015, "That Insane, \$81m Bangladesh Bank Heist? Here's What We Know," *Wired*, May 17, available at <https://www.wired.com/2016/05/insane-81m-bangladesh-bank-heist-heres-know/>
- [Escape of NSA tools](#)
- <https://www.nytimes.com/2019/05/06/us/politics/china-hacking-cyber.html?action=click&module=Top%20Stories&pgtype=Homepage>

Herstatt Risk:

- <https://thebusinessprofessor.com/knowledge-base/herstatt-risk-defined/>
- <https://transferwise.com/us>

Bitcoin thievery:

- Adelstein, Jake and Nathalie-Kyoko Stucky, 2016, "Behind the Biggest Bitcoin Heist in History: Inside the Implosion of Mt. Gox," *The Daily Beast*, May 19, available at <http://www.thedailybeast.com/behind-the-biggest-bitcoin-heist-in-history-inside-the-implosion-of-mt-gox>
- Note: Joseph Menn, 2016, "Former U.S. Secret Service Agent Suspected in Additional Bitcoin, Thefts," *Reuters*, June 30, available at <http://www.reuters.com/article/us-bitcoin-corruption-bridges-idUSKCN0ZH3FB>
- Segal, David. 2014, "Eagle Scout. Idealist. Drug Trafficker?" *The New York Times*, January 18, available at <https://www.nytimes.com/2014/01/19/business/eagle-scout-idealist-drug-trafficker.html>

Smart Contracts:

- Corkery, Michael, and Silver-Greenberg, Jessica. 2014. Miss A Payment? Good Luck Moving That Car. *The New York Times*. Deal Book.
- <https://dealbook.nytimes.com/2014/09/24/miss-a-payment-good-luck-moving-that-car/>

Payments Systems failures:

- Giles, Chris. 2015, "Bank of England Attacked Over Payment Systems Failure," *Financial Times*, March 25, available at <https://www.ft.com/content/979f2bf4-d2e0-11e4-a792-00144feab7de?mhq5j=e2>
- Note: the Deloitte report, which has been partly redacted by the Bank of England, can be downloaded by those interested at http://www.bankofengland.co.uk/publications/Documents/news/2015/rtps_deloitte.pdf

Flash crash:

- Yang, Stephanie. 2015. "Remembering the Flash Crash from the NYSE Trading Floor," *The Wall Street Journal*, May 6, available at <https://blogs.wsj.com/moneybeat/2015/05/06/remembering-the-flash-crash-from-the-nyse-trading-floor/>
- Hope, Bradley and Ackerman, Andrew. 2015, "'Flash Crash' Overhaul Is Snarled in Red Tape," *The Wall Street Journal*, May 5, available at <https://www.wsj.com/articles/flash-crash-overhaul-is-snarled-in-red-tape-1430868811>
- Note: The joint SEC-CFTC report on the flash crash can be downloaded by those interested at <https://www.sec.gov/news/studies/2010/marketevents-report.pdf>

Wirecard:

- The FT did a series of investigative reports about money-laundering and accounting fraud accusations against Wirecard, the largest European e-money licensed bank used by many fintechs: <https://www.ft.com/stream/ffd38f36-a94c-43f7-8a62-2f45caf1bea3>

28. May 7: **KTD** China's Social Sesame Score: Robots, AI and the Labor Market After FinTech, and Course Wrap up

- Dowd, Maureen. 2017. *Elon Musk's Billion-dollar Crusade to stop the AI Apocalypse*. Available at: <https://www.vanityfair.com/news/2017/03/elon-musk-billion-dollar-crusade-to-stop-ai-space-x>
- Agarwal, Gans, and Godfarb. 2016. *The Simple Economics of Machine Intelligence*.
- Knight, Will. 2017. *Meet the Chinese Finance Giant That's Secretly an AI Company*. Available at: <https://www.technologyreview.com/s/608103/ant-financial-chinas-giant-of-mobile-payments-is-rethinking-finance-with-ai/>
- Swift Institute: comparison of China and West approaches to Fintech: <https://swiftinstitute.org/research/quo-vadis-a-comparison-of-the-fintech-revolution-in-china-and-the-west/>
- NY Times series on China Internet Privacy: (3 articles)
- <https://www.nytimes.com/2019/04/13/opinion/china-internet-privacy.html>
- China facial recognition software: <https://www.nytimes.com/2018/07/24/business/dealbook/china-facial-recognition.html?searchResultPosition=1>
- <https://www.nytimes.com/2019/05/07/opinion/xi-trump-trade-war-china-leadership.html?action=click&module=Opinion&pgtype=Homepage>
- China Cracks down on tech credit scoring systems. *Financial Times*. February 4, 2018. <https://www.ft.com/content/f23e0cb2-07ec-11e8-9650-9c0ad2d7c5b5>
- Tencent and Alibaba refuse to hand loans data to Beijing. *Financial Times*. September 18, 2019. <https://www.ft.com/content/93451b98-da12-11e9-8f9b-77216ebe1f17>
- Is Silicon Valley Building a Chinese-Style Social Credit System? *Fast Company*. <https://www.fastcompany.com/90394048/uh-oh-silicon-valley-is-building-a-chinese-style-social-credit-system>
- Facebook Redlining: <https://www.nytimes.com/2019/03/29/opinion/facebook-discrimination-civil-rights.html>
- Facebook co founder video on concentration of power-Chris Hughes: <https://www.nytimes.com/video/opinion/10000006480848/chris-hughes-facebook-zuckerberg.html?action=click&module=Opinion&pgtype=Homepage>
- Banks AI plans threaten thousands of jobs. *Financial Times*. Available at: <https://www.ft.com/content/3da058a0-e268-11e6-8405-9e5580d6e5fb>

OPTIONAL:

- Lina M. Khan: Amazon's Antitrust Paradox (This is a long article on the anti-trust argument being used against platforms).
<https://www.yalelawjournal.org/note/amazons-antitrust-paradox>
- See also CB Insights on Amazon's platform strategy in Finance

FINAL EXAM WILL BE A TAKEHOME EXAM posted the last day of class (May 7) and due during the exam period (May 14). You will have one week (7 days) to complete the exam