

14.462 Advanced Macroeconomics II

Spring 2017

Robert M. Townsend

March 30, 2017

Topics

Measurement, Analysis, and Design of Financial Systems - First Principles as a Foundation for Policy.

Course Logistics

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Lectures:	TuTh	1:00-2:30 pm	E51-372
Recitations:	Fr	1:00-2:30 pm	E51-376
Office hours:	Fr	5:00-6:30 pm	E52-314

Course Overview

This course will cover several topics related to liquidity and financial intermediation. The focus of the course is on the design of financial contracts and markets, efficiency and policy interventions in a general equilibrium context. Special topics include innovations made possible by new technology, e-money and e-platforms.

A. Liquidity Payments and Monetary policy

- **Topic 1:** Risk in liquidity and clearing
 - Deferred payment and credit, trade fails and penalties, and systemic risk
- **Topic 2:** Innovations in financial systems, e-payments, and monetary policy
 - Limited communication and record keeping, distributed ledger technology, the emergence of private and public e-money, implementation of monetary policy

- **Topic 3:** Segmentation, high-velocity debt and coordination
 - Spatially separated agents or equivalent segmentation, high velocity circulating private and public debt as money, coordination problems and financial crashes
- **Topic 4:** Financial fragmentation and centrality
 - Fragmentation by market, asset, and/or trader; key marginal values in liquidity provision; notions of financial centrality
- **Topic 5:** Monetary models
 - Bubbles, efficiency, models of monetary economies with alternative obstacles to trade

B. Financial Intermediation, e-platforms, and Regulation

- **Topic 1:** Good and bad forms of competition
 - Trading rules with a general equilibrium focus, here, initially, without obstacles
- **Topic 2:** Platforms with private information
 - Optimal contracts and ideal operation of exchanges with private information
- **Topic 3:** Broker dealers as platforms in competition
 - Implementation of contracts with private Information and other obstacles as general equilibrium competitive outcome
- **Topic 4:** Financial platforms: one, many, or tiered and how they ought to function
 - Identifying key obstacles and features of the environment

Requirements

The grade will be based on class participation (15%), three problem sets (40%) and a discussion of a paper in class with write up due on June 18 (45%).

The discussion should consist of a summary of the key contribution of the paper and a critical assessment of its strengths or shortcomings. The critical assessment might include preliminary robustness checks, improvements or extensions. The summary of the paper should be less than a third of the presentation.

The discussions will take place during the recitations of Friday, April 28, and Friday, May 5. Each discussion will be allocated a 30-min slot. The time constraint will be strictly enforced. The write up should extend the discussion and be 10 to 12-page long. Students are encouraged to discuss possible avenues for further research.

Reading List

A. Liquidity

A.0 Motivation (half a lecture)

- Tobias, Adrien, and Hyun Shin (2010). "The changing nature of financial intermediation and the financial crisis of 2007-09," *FRB of New York Staff Report 439*.
- Alvarez, Fernando, Anan Pawasutipaisit and Robert Townsend. "Cash Management in Village Thailand: Positive and Normative Implications," Working Paper.
- Bassetto, Marco and Christopher Phelan (2015). "Speculative runs on interest rate pegs," *Journal of Monetary Economics*, vol. 73(C), pp. 99-114.
- Bech, Morten L., Antoine Martin and James J. McAndrews (2012). "Settlement liquidity and monetary policy implementation—lessons from the financial crisis," *Economic Policy Review*, Federal Reserve Bank of New York, March, pp. 3-20.
- Bianchi, Javier and Saki Bigio (2014). "Banks Liquidity Management and Monetary Policy," Staff Report 503, Federal Reserve Bank of Minneapolis .
- Cocco, João F., Francisco J. Gomes and Nuno C. Martins (2009). "Lending relationships in the interbank market," *Journal of Financial Intermediation*, vol. 18(1), pp. 24-48.
- Del Negro, Marco and Christopher A. Sims (2015). "Central Bank Solvency and Inflation", *Liberty Street Economics*.
- Di Maggio, Macro, Amir Kermani and Christopher Palmer (2016). "How Quantitative Easing Works: Evidence on the Refinancing Channel," NBER Working Paper 22638.
- Garratt, Rod, Antoine Martin, James J. McAndrews and Ed Nosal (2015). "Segregated balance accounts," Staff Reports 730, Federal Reserve Bank of New York.
- Huberto M. Ennis, and Todd Keister (2008). "Run equilibria in a model of financial intermediation," Staff Reports 312, Federal Reserve Bank of New York.
- Jack, William, Tavneet Suri and Robert Townsend (2010). "Monetary Theory and Electronic Money: Reflections on the Kenyan Experience," *FRB RICHMOND, Economic Quarterly*, vol. 96(1), pp. 83-122.
- Li, Dan & Norman Schürhoff (2014). "Dealer Networks," CEPR Discussion Paper 10237.
- Lim, Youngjae and Robert Townsend (1998). "General Equilibrium Models of Financial Systems: Theory and Measurement in Village Economies," *Review of Economic Dynamics*, vol. 1(1), pp. 59-118.
- Martin, Antoine and James J. McAndrews (2008). "An economic analysis of liquidity-saving mechanisms", *Economic Policy Review*, Federal Reserve Bank of New York, September, pp. 25-39.
- Piazzesi, Monika and Martin Schneider (2016). "[Payments, Credit and Asset Prices](#)", Working Paper.
- Samphantharak, Schuh and Townsend (2016) [TO ADD] "Integrated Household Financial Surveys: An Assessment of US Methods and an Innovation"

- Terrence Hendershott and Ananth Madhavan (2015). "Click or Call? Auction versus Search in the Over-the-Counter Market," *Journal of Finance*, vol. 70(1), pp. 419-447, 02.

A.1 Risk in Liquidity and Clearing (half a lecture)

- Bech, Morten L., Antoine Martin and James McAndrews (2012). "Settlement Liquidity and Monetary Policy Implementation—Lessons from the Financial Crisis," *Economic Policy Review*, Federal Reserve Bank of New York, March 2012.
- *Dubey, Pradeep (1982). "Price-Quantity Strategic Market Games," *Econometrica*, vol. 50(1), pp.111-126.
- Fleming, Michael J. and Kenneth D. Garbade (2005). "Explaining settlement fails," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, vol. 11, September 2005.
- Garbade, Kenneth D., Frank M. Keane, Lorie Logan, Amanda Stokes and Jennifer Wolgemuth (2010). "The introduction of the TMPG fails charge for U.S. Treasury securities," *Economic Policy Review*, Federal Reserve Bank of New York, October, pp. 45-71.
- Kuussaari, Harri (1996). "Systemic Risk in the Finnish Payment System: an Empirical Investigation," *Bank of Financial Discussion Papers*, March 1996.
- Güntzer, Michael M., Dieter Jungnickel and Matthias Leclerc (1998). "Efficient algorithms for the clearing of interbank payments," *European Journal of Operational Research*, vol. 106(1), pp. 212-219.
- Pradeep Dubey, John Geanakoplos and Martin Shubik (2005). "Default and Punishment in General Equilibrium," *Econometrica*, vol. 73(1), pp. 1-37.
- Townsend, Robert (1990). "Financial Structure an Economic Organization". Basil Blackwell Inc. (1990).

A.2 Innovations in Financial Systems, E-Payments and Monetary Policy (half a lecture)

- Buiter, Willem H. (2009). "Negative Nominal Interest Rates: Three ways to overcome the zero lower bound," NBER Working Papers 15118.
- Mills, David C., Kathy Wang, Brendan Malone, Anjana Ravi, Jeffrey C. Marquardt, Jeffrey C., Clinton Chen, Anton Badev, Timothy Brezinski, Linda Fahy, Kimberley Liao, Vanessa Kargenian (2016). "Distributed Ledger Technology in Payments, Clearing, and Settlement," *Finance and Economics Discussion Series 2016-095*, Board of Governors of the Federal Reserve System (U.S.).
- *Ostroy, Joseph M. and Ross M. Starr, (1974). "Money and the Decentralization of Exchange," *Econometrica*, 42(6), pp.1093–1113.
- Pinna, Andrea and Wiebe Ruttenberg (2016). "Distributed ledger technologies in securities post-trading - Revolution or evolution?," *Occasional Paper Series 172*, European Central Bank.
- Raskin, Max and David Yermack (2016). "Digital Currencies, Decentralized

- Ledgers, and the Future of Central Banking", NBER Working Paper 22238.
- Rogoff, Kenneth S. (2016). "The Curse of Cash," Princeton University Press, Ref. 10798.

A.3 Segmentation, High Velocity Debt, and Coordination (half a lecture)

- Bagehot, Walter (1873). "Lombard Street: A Description of the Money Market". Wiley Investment Classics, April 1999.
- Elliott, Nicholas, John Odgers and Jonathan Mark Phillips (2001). "Byes on Bills of Exchange and Cheques". Basil Blackwell Inc., 2001.
- De Roover, Raymond (1948). "Money, Banking and Credit in Mediaeval Bruges," Medieval Academy of America.
- Krishnamurthy, Arvind and Annette Vissing-Jorgensen (2012). "The Aggregate Demand for Treasury Debt," *Journal of Political Economy*, vol. 120(2), pp. 233-267.
- Krishnamurthy, Arvind and Annette Vissing-Jorgensen (2015). "The impact of Treasury supply on financial sector lending and stability," *Journal of Financial Economics*, vol. 118(3), pp. 571-600.
- Singh, Manmohan (2011). "Velocity of Pledged Collateral; Analysis and Implications," IMF Working Paper 11/256.
- *Townsend, Robert and Neil Wallace (1987). "Circulating Private Debt: An Example with Coordination Problem," Contractual Arrangements for Intertemporal Trade.

A.4 Financial Fragmentation and Centrality (one lecture)

- Allen, Franklin and Douglas Gale (2000). "Financial Contagion," *Journal of Political Economy*, vol. 108(1), pp. 1-33
- Armenter, Roc and Benjamin Lester (2015). "Excess Reserves and Monetary Policy Normalization," Working Paper.
- Bech, Moren L. and Enghin Atalay (2010). "The Topology of the Federal Funds Market," *Physica A: Statistical Mechanics and its Applications*, vol. 389(22), pp. 5223-5246.
- Boss, Michael, Helmut Elsinger, Martin Summer and Stefan Thurner (2003). "The Network Topology of the Interbank Market," *Quantitative Finance*, vol. 4(6), pp. 677-684.
- *Chandrasekhar, Arun G., Robert Townsend, R. and Juan P. Xandri (2014). "Network Centrality and the Price of Personalized Debt," mimeo MIT.
- Duffie, Darrel, Nicolae Gârleanu and Lasse Heje Pedersen (2005). "Over-the-Counter Markets," *Econometrica*, vol. 73(6), pp. 1815-1847.
- Freeman, Scott (1996). "Clearinghouse Banks and Banknote Over-Issue," *Journal of Monetary Economics*, vol. 38(1), pp. 101-115.

- Green, Edward J. and Ruilin Zhou (1998). "A Rudimentary Random-Matching Model with Divisible Money and Prices," *Journal of Economic Theory*, vol. 81(2), pp. 252-271.
- Jaramillo et al. (2012), An Empirical Study of the Mexican Banking System Network and Its Implications for Systemic Risk
- Kiyotaki, Nobuhiro and Randall Wright (1989). "On Money as a Medium of Exchange," *Journal of Political Economy*, vol. 97(4), pp. 927-954.
- Scott, Frame, W., Andreas Fuster, Joseph Tracy and James Vickery (2015). "The rescue of Fannie Mae and Freddie Mac," Staff Reports 719, Federal Reserve Bank of New York.
- Santos, Manuel S. and Michael Woodford (1997). "Rational Asset Pricing Bubbles," *Econometrica*, vol. 65(1), pp. 19-57.
- Shapley, Lloyd & Shubik, Martin (1977). "Trade Using One Commodity as a Means of Payment," *Journal of Political Economy*, 85(5), pp.937–968.
- **Summer, M. (2013)**. Financial Contagion and Network Analysis, Annual Reviews of Financial Economics, 5, 1–38.
- Upper, Christian and Andreas Worms (2004). "Estimating bilateral exposures in the German interbank market: Is there a danger of contagion?" *European Economic Review*, vol. 48(4), pp. 827-849.

A.5 Monetary Models (two lectures)

Money aggregates and some counterarguments

- Briglevics, Tamás and Scott Schuh (2014). "U.S. consumer demand for cash in the era of low interest rates and electronic payments," Working Paper Series 1660, European Central Bank.
- Buera, Francisco J. and Juan P. Nicolini (2014). "Liquidity Traps and Monetary Policy: Managing a Credit Crunch," Working Papers 714, Federal Reserve Bank of Minneapolis.
- Lucas, Robert E. and Juan P. Nicolini (2015). "On the Stability of Money Demand," Working Papers 718, Federal Reserve Bank of Minneapolis.
- Woodford, Michael (1998). "Doing Without Money: Controlling Inflation in a Post-Monetary World," *Review of Economic Dynamics*, vol. 1(1), pp. 173-219, January.

Bubbles and Obstacles to Trade

- *Abel, Andrew B., Gregory N. Mankiw, Lawrence H. Summers and Richard J. Zeckhauser (1989). "Assessing Dynamic Efficiency: Theory and Evidence," *Review of Economic Studies*, vol. 56(1), pages 1-19.
- Alvarez, Fernando and Francesco Lippi (2009). "Financial Innovation and the Transaction Demand for Cash," *Econometrica*, vol. 77(2), pp. 363-402.

- Alvarez, Fernando, Anan Pawasutipaisit and Robert Townsend (2015). “Cash Management in Village Thailand: Positive and Normative Implications,” Working Paper.
- *Bewley, Truman (1980). “The Optimum Quantity of Money,” In J. H. Kareken & N. Wallace, eds. *Models of Monetary Economies*. Minneapolis: Federal Reserve Bank of Minneapolis, pp. 169–210.
- Dandekar, Pranav, Ashish Goel, Ramwsh Govindan and Ian Post (2010). “Liquidity in Credit Networks: A Little Trust Goes a Long Way,” Working Paper.
- Freeman, Scott (1996). “Clearinghouse Banks and Banknote Over-Issue,” *Journal of Monetary Economics*, vol. 38(1), pp. 101-115.
- Garbade, Kenneth D., and William L. Silber (1979). “The Payment System and Domestic Exchange Rates: Technological versus Institutional Change,” *Journal of Monetary Economics*, vol. 5 (1), pp. 1-22.
- *Geerolf, François (2013). “Reassessing Dynamic Efficiency,” mimeo UCLA.
- Green, Edward J. (1999). “Money and Debt in the Structure of Payments,” Federal Reserve Bank of Minneapolis, Quarterly Review 23.
- Heller, Walter Perrin and Ross M. Starr (1976). “Equilibrium with Non-Convex Transactions Costs: Monetary and Non-Monetary Economies,” *The Review of Economic Studies*, vol. 43(2), pp. 195-215.
- Kiyotaki, Nobuhiro and Randall Wright (1989). “On Money as a Medium of Exchange,” *Journal of Political Economy*, vol. 97(4), pp. 927-954.
- Kocherlakota, Narayana R. (1992). “Bubbles and constraints on debt accumulation,” *Journal of Economic Theory*, vol. 57(1), pp. 245-256.
- Kocherlakota, Narayana R. (2005) “Optimal Monetary Policy: What We Know and What We Don’t Know,” Quarterly Review, Federal Reserve Bank of Minneapolis, October 2005.
- Malinowski, Bronislaw (1922). “*Argonauts of the Western Pacific: An Account of Native Enterprise and Adventure in the Archipelagos of Melanesian New Guinea*”.. London: Routledge & Kegan Paul.
- Mankiw, Gregory N. and Jeffrey A. Miron (1991). “Should the Fed Smooth Interest Rates? The Case of Seasonal Monetary Policy,” Carnegie-Rochester Conference Series on Public Policy, vol. 34, pp. 41-70.
- Manuelli, Rodolfo & Sargent, Thomas J. (2010). “Alternative Monetary Policies In A Turnpike Economy,” *Macroeconomic Dynamics*, vol. 14(05), pp. 727-762.
- Martin, Alberto and Jaime Ventura (2012). “Economic Growth with Bubbles,” *The American Economic Review*, vol. 102, No. 6, pp. 3033-3058
- Munyan, Benjamin (2015). “Regulatory Arbitrage in Repo Markets,” Office of Financial Research Working Paper No. 15-22.
- Paweenawat, Archawa and Robert M. Townsend (2013). “Village Economic Accounts: Real and Financial Intertwined,” *American Economic Review*, vol. 102(3), pp. 441-446.
- Samuelson, Paul A. (1958). “An Exact Consumption-Loan Model of Interest with or without the Social Contrivance of Money,” *Journal of Political Economy*, vol. 66(6), pp. 467–482.
- Santos, Manuel S. and Woodford, Michael (1997). “Rational Asset Pricing Bub-

- bles," *Econometrica*, vol. 65(1), pp. 19-58, January.
- Sargent, Thomas J. And Neil Wallace (1982). "The Real-Bills Doctrine versus the Quantity Theory: A Reconsideration," *Journal of Political Economy*, vol. 90(6), pp. 1212-1236.
 - *Tirole, Jean (1985). "Asset Bubbles and Overlapping Generations," *Econometrica*, vol. 53(6), pp. 1499-1528.
 - Townsend, Robert M. (1980). "Models of Money with Spatially Separated Agents," in *Models of Monetary Economies*, John Kareken and Neil Wallace, eds., Federal Reserve Bank of Minneapolis, 1980, pp. 265-303.
 - Townsend, Robert M. (1989). "Currency and Credit in a Private Information Economy," *Journal of Political Economy*, vol. 97(6), pp. 1323-1344.
 - Trejos, Alberto and Randall Wright (2014). "Search-Based Models of Money and Finance: An Integrated Approach", Working Paper.
 - Wallace, Neil (2013). "Optimal Money Creation in "Pure Currency" Economies: A Conjecture," *Quarterly Journal of Economics*, vol. 129(1), pp. 259-274.

B. Platforms

B.0 Motivation (one lecture)

- Aghlevli, Bijan B. (1999). "The Asian Crisis: Causes and Remedies", *Finance & Development*, IMF, June 1999, Vol. 36, No. 2
- Duffie, Darrell (2014). "Financial Market Infrastructure: Too Important to Fail," *Economics Working Papers 14101*, Hoover Institution, Stanford University.
- Duffie, Darrell and Haoxiang Zhu (2011). "Does a Central Clearing Counterparty Reduce Counterparty Risk?," memo Stanford Graduate School of Business.
- Flemming, Michael J. and Kenneth D. Garbade (2003). "The Repurchase Agreement Refined: GCF Repo," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, vol. 6(9), June 2003.
- Kiff, John, Jennifer Elliott, Elias Kazarian, Jodi Scarlata and Carolzne Spackman (2009). "Credit Derivatives: Systemic Risks and Policy Options?," IMF Working Paper 09/254.
- Klapper, Leora (2005). "The Role of Factoring for Financing Small and Medium Enterprises", *Policy Research Working Papers*, World Bank, June 2005.
- O'Hara, Maureen and Mao Ye (2011). "Is Market Fragmentation Harming Market Quality?," *Journal of Financial Economics*, 100(3), pp.459-474.
- Radelet, Steven and Jeffrey D. Sachs (1998). "The East Asian Financial Crisis: Diagnosis, Remedies, Prospects," *Brookings Papers on Economic Activity*, 29, vol. 1, pp. 1-90.
- Sripakdeevong, Parit, and Robert M. Townsend (2016). "The Village Money Market Revealed: Shadow Banking and Credit Chains," Working Paper.
- Tambunlertchai, Kanittha (2015). "Financial Inclusion, Financial Regulation, and Financial Education in Thailand," ADBI Working Papers 537, Asian Development Bank Institute.

- Townsend, Robert M. (2016) "Village and Larger Economies: The Theory and Measurement of the Townsend Thai Project," *Journal of Economic Perspectives*, vol. 30 (4), pp. 199-220.

B.1 Good and Bad Forms of Competition (one lecture)

- Ausubel, Lawrence M. (2006). "Efficient Dynamic Auctions for Heterogeneous Commodities", *The American Economic Review*, vol. 96, No. 3, pp. 602-629
- Ausubel, Lawrence M. and Paul R. Milgrom (2002). "Ascending Auctions with Package Bidding", *Frontiers of Theoretical Economics*, vol. 1, article 1
- Ausubel, Lawrence M., Peter Cramton and Paul R. Milgrom (2006) "The Clock-Proxy Auction: A Practical Combinatorial Auction design", Chapter 5 of Cramton, P., Shoham, Y. and Steinberg R. (2006) "Combinatorial Auctions", *MIT Press*, pp. 115-138
- Border Kim C. (2000). "(Non-)Existence of Walrasian Equilibrium," *Journal of Economic Dynamics and Control*, vol. 53, pp.144-160.
- Breuer, Thomas, Martin Summer, M. and Hans-Joachim Vollbrecht (2015). "Endogenous leverage and asset pricing in double auctions," *Journal of Economic Dynamics and Control*, vol. 53, pp.144-160.
- Budish Eric, Peter Cramton P. and John Shim. "The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Design Response" *Quarterly Journal of Economics*, vol. 130(4) pp. 1547-1621
- Daniels, Kenneth and Jayaraman Vijayakumar (2001). "The competitive impact of commercial bank underwriting on the market for municipal revenue bonds," *Journal of Financial Services Research*, 20(1), pp.57-75.
- Du, Songzi and Hoaxiang Zhu (2017). "Are CDS Auctions Biased and Inefficient?," *Journal of Finance* (forthcoming).
- Du, Songzi and Hoaxiang Zhu (2017). "What Is the Optimal Trading Frequency in Financial Markets?," *Review of Economic Studies* (forthcoming).
- Dubey, Pradeep and Dieter Sondermann (2008). "Perfect Competition in an Oligopoly (including Bilateral Monopoly)", *Games of Economic Behavior* 65, pp. 124-141.
- Geanakoplos, John, (2010). *The Leverage Cycle*, University of Chicago Press, pp. 1-65.
- Kilenthong, Weerachart T. and Cheng-Zhong Qin C. (2014). "Trade Through Endogenous Intermediaries," *Journal of Mathematical Economics*, vol. 50, pp.262-268.
- Klemperer, Paul (2009). "A New Auction for Substitutes: Central-Bank Liquidity Auctions, "Toxic Asset" Auctions, and Variable Product-Mix Auctions," mimeo University of Oxford.
- Knapp, Gunnar, Cathy Roheim, C.A. and James L. Anderson (2007). "The Great Salmon Run: Competition Between Wild and Farmed Salmon," *Traffic North America*.
- Makowski, Louis (1980). "Perfect Competition, the Profit Criterion, and the Or-

- ganization of Economic Activity”, *Journal of Economic Theory*, vol. 22, issue 2, pp. 222-242
- Maskin. “Optimal Multi-Unit Auctions,” in “The Economics of Missing Markets, Information, and Games,” Oxford University Press, 1989, pp. 312-335.
 - Myerson, Roger B. and Mark A. Satterthwaite (1983). "Efficient Mechanisms for Bilateral Trading," *Journal of Economic Theory*, vol. 29(2), pp. 265-281.
 - *Pesendorfer, Wolfgang (1995). “Financial Innovation in a General Equilibrium Model,” *Journal of Economic Theory*, vol. 65, pp. 79-116
 - Porter, David, Stephen Rassenti, Anil Roopnarine and Vernon Smith (2003), “Combinatorial Auction Design,” *Proceedings of the National Academy of Sciences*, 100, 11153-11157.
 - Scarf, Herbert E. (1967). “The Core of an N Person Game,” *Econometrica: Journal of the Econometric Society*, pp.50-69.
 - Segal, Ilya (2007). “The Communication Requirements of Social Choice Rules and Supporting Budget Sets,” *Journal of Economic Theory*, vol. 136(1), pp. 341-378
 - *Townsend, Robert M. (1983). Theories of intermediated structures. *Carnegie-Rochester Conference Series on Public Policy*, 18, pp.221–272.
 - Wilson Robert B. (1978). “Competitive Exchange” *Econometrica*, vol. 46(3), pp. 577-585
 - Yanelle, Marie-Odile (1997). “Banking Competition and Market Efficiency” *Review of Economic Studies*, vol. 64(2) pp. 215-239.
 - Yildiz, Muhamet (2003). "Walrasian bargaining," *Games and Economic Behavior*, vol. 45(2), pp. 465-487.

Other:

- Chicago Board of Trade (1982). “Grains, Production, Processing, Marketing.”

B.2 Platforms with Private Information (one lecture)

- Berlin Mitchell, Loreta J. Mester (1999). “Deposits and Relationship Lending” *The Review of Financial Studies*, vol. 12(3), pp. 579-607.
- Doepke, Matthias and Robert M. Townsend (2006). “Dynamic mechanism design with hidden income and hidden actions,” *Journal of Economic Theory*, vol. 126(1), pp. 235-285
- Fernandes, Ana and Christopher Phelan (2000). "A Recursive Formulation for Repeated Agency with History Dependence," *Journal of Economic Theory*, vol. 91(2), pp. 223-247.
- Jackson, Matthew, Hugo Sonnenschein and Xiqing Xing (2016). “A Theory of Efficient Negotiations,” mimeo Stanford.
- Green, Edward J. and Soo-Nam Oh (1991). "Contracts, constraints, and consumption," Staff Report 143, Federal Reserve Bank of Minneapolis.

- Liu, Qinqmin and Andrezej Skrzypacz (2013). "Limited Records and Reputation Bubbles," mimeo Stanford University.
- Kirk, Adam, James J. McAndrews, Parinitha Sastry and Phillip Weed, P. (2014). "Matching Collateral Supply and Financing Demands in Dealer Banks," FRBNY Economic Policy Review, December 2014.
- Peters, Michael and Cristián Troncoso-Valverde, Cristián (2013). "A folk theorem for competing mechanisms," *Journal of Economic Theory*, vol. 148(3), pp. 953-973.
- Tadelis, Steven (2016). "Reputation and Feedback Systems in Online Platform Markets," *Annual Review of Economics*, vol. 8, pp. 321-340.
- *Townsend, Robert M. (1982). "Optimal Multiperiod Contracts and the Gain from Enduring Relationships under Private Information," *Journal of Political Economy*, vol. 90(6), pp. 1166-1186.
- Townsend, Robert M. (1987). "Economic organization with limited communication," *The American Economic Review*, vol. 77(5), pp. 954-971.
- *Townsend, Robert M. (1988). "Information constrained insurance: the revelation principle extended," *Journal of Monetary Economics*, vol. 21(2), pp. 411-450.
- Zhu, Haoxiang (2013). "Do dark pools harm price discovery?," *Review of Financial Studies*, vol. 27(3), pp. 747-789.

B.3 Broker Dealers as Platforms and Competition (one lecture)

- Agrawal, Ajay, Christian Catalini, and Avi Goldfarb (2016). "Are Syndicates the Killer App of Equity Crowdfunding?," *California Management Review*, vol. 58:2, pp.111-124.
- *Allen, Franklin and Douglas Gale (2004). "Financial intermediaries and markets," *Econometrica*, vol. 72(4), pp.1023-1061.
- Alvarez, Fernando and Urban J. Jermann (2000). "Efficiency, Equilibrium, and Asset Pricing with Risk of Default," *Econometrica*, vol. 68(4), pp. 775-798.
- Ashcraft, Adam B., Kunal Gooriah and Amir Kermani (2014). "Does Skin-in-the-Game Affect Security Performance?," Working Paper.
- Attar, Andrea, Thomas Mariotti and François Salanié (2011). "Nonexclusive Competition in the Market for Lemons," *Econometrica*, vol. 79(6), pp. 1869-1918.
- Bisin, Alberto and Piero Gottardi (2006). "Efficient Competitive Equilibria with Adverse Selection," *Journal of political Economy*, 114(3), pp.485-516.
- DeMarzo, Peter M. (2005). "The Pooling and Tranching of Securities: A Model of Informed Intermediation," *Review of Financial Studies*, vol. 18(1), pp. 1-35.
- Jacklin, Charles J. (1987). "Demand deposits, trading restrictions, and risk sharing," *Contractual Arrangements in Intertemporal Trade*.
- Joaquim, Gustavo, Townsend, Robert .M. and Victor V. Zhorin (2014). "Spatial competition among financial service providers and optimal contract design," Working Paper.

- Lin, Mingfeng, Prabhala, N.R. and Siva Viswanathan (2013). “Judging borrowers by the company they keep: friendship networks and information asymmetry in online peer-to-peer lending,” *Management Science*, 59(1), pp.17-35.
- Mueller, Rolf and Robert M. Townsend (1998). "Mechanism Design and Village Economies: From Credit, to Tenancy, to Cropping Groups," *Review of Economic Dynamics*, vol. 1(1), pp. 119-172.
- Netzer, Nick and Florian Scheuer (2014). “A game theoretic foundation of competitive equilibria with adverse selection,” *International Economic Review*, 55(2), pp. 399-422.
- *Prescott, E.C. and Robert M. Townsend (1984). “Pareto Optima and Competitive Equilibria with Adverse Selection and Moral Hazard,” *Econometrica*, 52(1), pp. 21–45.
- *Prescott, Edward C. and Robert M. Townsend (1984). “General Competitive Analysis in an Economy with Private Information,” *International Economic Review*, 25(1), pp. 1–20.
- Prescott Edward C. and Robert M. Townsend (2006). “Firms as Clubs in Walrasian Markets with Private Information,” *Journal of Political Economy*, vol. 114(4), pp. 644-671.
- Rothschild, Michael and Joseph E. Stiglitz (1976). “Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information,” *The Quarterly Journal of Economics*, 90(4), pp.629-649.
- Spence, Michael (1973). “Job Market Signaling,” *The Quarterly Journal of Economics*, vol. 87(3), pp. 355-374.
- Stiglitz, Joseph E. and Andrew Weiss, A (1981). “Credit rationing in markets with imperfect information,” *The American economic Review*, vol. 71(3), pp.393-410.

B.4 Financial Platforms: One, Many or Tiered (two lectures)

- Acemoglu Daron, Zilibotti Fabrizio (1997). “Was Prometheus Unbound by Chance? Risk, Diversification, and Growth” *The Journal of Political Economy*, vol. 105(4) pp. 709-751
- Acharya Viral and Alberto Bisin (2014). “Counterparty Risk Externalities: Centralized versus Over-the-Counter Markets,” *Journal of Economic Theory*, vol. 149, pp. 153.
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