

Economics 612: Seminar in Macroeconomics
Financial Frictions and Liquidity in Macroeconomics

Objectives and Learning Outcomes: This course will introduce students to the literature on banking, liquidity and financial crises in a macroeconomic context. We will go through a number of papers in detail, focusing on both economic issues and modeling approaches. In addition to familiarizing students with this literature, a central aim of the course is to prepare students for conducting original research in macroeconomics. Within the context of the topics outlined below, we will discuss the process of doing research: formulating a question, developing an appropriate model, and deriving and interpreting results. Students will also gain experience in giving research presentations.

Course Requirements: Course grades will be based on the following three categories.

Active participation: Students are expected to read the assigned papers before each meeting and to actively participate in all class discussions by asking and answering questions.

Presentations: Each student will give two in-class presentations. The first presentation will be a critical review of one paper from the reading list below, or of a paper not on this list with my approval. The deadline for choosing a paper to present is **February 7**. The second presentation may be either a critical review of another paper on this list or a research proposal. If the presentation is a critical review, the deadline for choosing a paper to present is **April 11**. The precise format and dates for these presentations will be discussed in class.

Research proposal: Each student will write a research proposal based on material covered in the course. This proposal may or may not be related to the student's second-year paper. The proposal should (i) clearly identify a research question, (ii) provide an overview of the existing literature on the topic and how this question fits into that literature, (iii) describe a model that can be used to answer the question, and (iv) describe a plan of action that would lead to a completed research paper. Depending on the specific project, it may or may not be possible to partially solve the model described in point (iii); either way, the primary focus should be on the research question and the methods that will be used to address it, rather than the solution itself.

A short (two-page) pre-proposal is due by **Friday, March 30**. The pre-proposal should identify the research question and provide a list of relevant references. The final draft of the research proposal is due by **Friday, May 4**.

Outline and Readings

The outline below may be revised over the course of the semester. We will not have time to cover all of the sections listed; only a subset will be discussed. Papers marked with an asterisk are the ones I am most likely to cover in class.

I. Financial markets, contracts and intermediaries

(a) Background

Modigliani, F. and M. Miller (1958) "The Cost of Capital, Corporation Finance and the Theory of Investment," *American Economic Review* 48, 261-297.

Gorton G. and A. Winton, (2002) "Financial Intermediation", Handbook of the Economics of Finance. Eds: Constantinides, Harris and Stulz. North Holland.

Frexias, X. and J.C. Rochet (2008) *The Microeconomics of Banking*, 2nd edition, MIT press.

(b) Liquidity provision and consumption smoothing

*Diamond D. and P. Dybvig (1983) "Bank Runs, Deposit Insurance and Liquidity," *Journal of Political Economy* 91, 401-419.

*Holmstrom, B. and J. Tirole (1997) "Financial Intermediation, Loanable Funds, and the Real Sector," *Quarterly Journal of Economics* 112, 663-691.

Holmstrom H. and J. Tirole, (1998) "Private and Public Supply of Liquidity," *Journal of Political Economy* 106, 1-40.

Allen, F and D. Gale (2004) "Financial Intermediaries and Markets," *Econometrica* 72, 1023-1062.

(c) Delegated monitoring

Townsend, R. (1979), "Optimal Contracts and Competitive Markets with Costly State Verification," *Journal of Economic Theory* 21, 265-293.

*Diamond D. (1984), "Financial Intermediation and Delegated Monitoring," *Review of Economic Studies* 51, 393-414.

Gale D. and M. Hellwig (1985), "Incentive Compatible Debt Contracts: The One-Period Problem," *Review of Economic Studies* 52, 647-663.

Bester, H. (1985) "Screening vs. Rationing in Credit Markets with Imperfect Information," *American Economic Review* 71, 393-410.

Diamond D. (1991), "Debt Maturity Structure and Liquidity Risk," *Quarterly Journal of Economics* 106, 709-737.

(d) Incomplete contracts and commitment

*Calomiris, C. and C. Kahn (1991) "The Role of Demandable Debt in Structuring Optimal Banking Arrangements," *American Economic Review* 81, 497-513.

Aghion P. and P. Bolton (1992) "An Incomplete Contracts Approach to Financial Contracting," *Review of Economic Studies* 59, 473-494.

Hart, O. and J. Moore (1994) “A Theory of Debt Based on the Inalienability of Human Capital,” *Quarterly Journal of Economics* 109, 841-879.

Hart, O. (1995) “Firms, Contacts and Financial Structure,” Clarendon Lectures in Economics, Oxford University Press.

*Diamond D. and R. Rajan (2001), “Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking,” *Journal of Political Economy* 94, 691-719.

(e) *Information, banking and liquidity*

Leland, H. and D. Pyle (1977) “Informational Asymmetries, Financial Structure, and Financial Intermediation,” *Journal of Finance* 31, 371-387.

Campbell, T. and W. Kracow (1980) “Information Production, Market Signaling and the Theory of Financial Intermediation,” *Journal of Finance* 35, 863-881.

*Stiglitz, J. and A. Weiss (1981) “Credit Rationing in Markets with Imperfect Information,” *American Economic Review* 71, 393-410.

Boyd, J. and E. Prescott (1986) “Financial Intermediary Coalitions,” *Journal of Economic Theory*, 38, 211-232.

Kaplan, T. (2006) “Why Banks Should Keep Secrets,” *Economic Theory* 27, 341-357.

*Dang, T.V., Gorton, G., Holmstrom, B. and G. Ordonez (2017) “Banks as Secret Keepers,” *American Economic Review* 107, 1005-1029.

(f) *Financial frictions and business cycles*

Bernanke, B. and M. Gertler (1989) “Agency Costs, Net Worth and Business Fluctuations,” *American Economic Review* 79, 14-31.

*Kiyotaki, N. and J. Moore (1997), “Credit Cycles,” *Journal of Political Economy* 105, 211-248.

Carlstrom, C. and T. Fuerst (1997) “Agency Costs, Net Worth and Business Fluctuations: A Computable General Equilibrium Analysis,” *American Economic Review* 87, 893-910.

*Lorenzoni, G. (2008) “Inefficient Credit Booms,” *Review of Economic Studies* 75, 809-833.

*Quadrini, V. (2011) “Financial Frictions in Macroeconomic Fluctuations,” Federal Reserve Bank of Richmond *Economic Quarterly* 97, 209-254.

II. Causes of banking fragility

(a) *Introduction*

*Cooper, R. and T.W. Ross (1998) “Bank Runs: Liquidity Costs and Investment Distortions,” *Journal of Monetary Economics* 41, 27-38.

Ennis, H.M. and T. Keister (2010) “On the Fundamental Reasons for Bank Fragility,” Federal Reserve Bank of Richmond *Economic Quarterly* 96, 35-58.

(b) Optimal banking contracts and fragility

Wallace, N. (1990) “A Banking Model In Which Partial Suspension Is Best” Federal Reserve Bank of Minneapolis *Quarterly Review* 14 (Fall), 11-23.

*Green E.J. and P. Lin (2000) “Diamond and Dybvig’s Classic Theory of Financial Intermediation: What’s Missing?” Federal Reserve Bank of Minneapolis *Quarterly Review* 24, 3-13.

Green, E.J. and P. Lin (2003) “Implementing Efficient Allocations in a Model of Financial Intermediation,” *Journal of Economic Theory* 109, 1-23.

*Peck, J. and K. Shell (2003) “Equilibrium Bank Runs,” *Journal of Political Economy* 111, 103-123.

Ennis, H.M. and T. Keister (2009) “Run Equilibria in the Green-Lin Model of Financial Intermediation,” *Journal of Economic Theory* 144, 1996-2020.

Sultanum, B. (2014) “Optimal Diamond–Dybvig Mechanism in Large Economies with Aggregate Uncertainty,” *Journal of Economic Dynamics and Control* 40, 95–102.

Cavalcanti, R. and P. Monteiro (2016) “Enriching Information To Prevent Bank Runs,” *Economic Theory* 62, 477–494.

Andolfatto, D., E.Nosal and B.Sultanum (2017) “Preventing Bank Runs,” *Theoretical Economics* 12, 1003–1028

(c) Limited commitment

Ennis, H. and T. Keister (2009) “Bank Runs and Institutions: The Perils of Intervention,” *American Economic Review* 99, 1588-1607.

*Ennis, H. and T. Keister (2010) “Banking Panics and Policy Responses,” *Journal of Monetary Economics* 57, 404-419.

Li, Y. (2017) “Interest Rates and Financial Stability,” *Journal of Economic Dynamics and Control* 82, 195-205.

(d) International dimensions

Chang, R., and A. Velasco (2000) “Financial Fragility and the Exchange Rate Regime,” *Journal of Economic Theory* 92, 1-34.

Chang, R. and A. Velasco (2001) “A Model of Financial Crises in Emerging Markets,” *Quarterly Journal of Economics* 116, 489-517.

(e) Other models of banking crises

Williamson, S (1988), "Liquidity Banking and Bank Failures," *International Economic Review* 29, 25-43.

Champ, B., B. Smith, and S. Williamson (1996) "Currency Elasticity and Banking Panics: Theory and Evidence," *Canadian Journal of Economics* 29, 828-864.

Allen F. and D. Gale (1998), "Optimal Financial Crises," *Journal of Finance*, Papers and Proceedings 53, 1245-1284.

Allen, F. and D. Gale (2004) "Financial fragility, liquidity, and asset prices," *Journal of the European Economic Association* 2, 1015-1048.

Gorton G. and L. Huang, (2006) "Bank Panics and the Endogeneity of Central Banking," *Journal of Monetary Economics* 53, 1613-1629.

Uhlig, H. (2010) "A Model of a Systemic Bank Run," *Journal of Monetary Economics* 57, 78-96. (see also the discussion by T. Keister, p. 97-100 of the same issue)

III. Strategic uncertainty and global games

*Morris, S. and H.S. Shin (1998) "Unique Equilibrium in a Model of Self-Fulfilling Currency Attacks," *American Economic Review* 88, 587-597.

Morris, S. and H.S. Shin (2000) "Rethinking Multiple Equilibria in Macroeconomics", NBER Macroeconomics Annual, 139-161. (See also the discussions by A. Atkeson and H. Rey).

Rochet, J.C. and X. Vives (2004) "Coordination failures and the lender of last resort: Was Bagehot right after all?" *Journal of the European Economic Association* 2, 1116-1147.

*Goldstein, I. and A. Pauzner (2005) "Demand-Deposit Contracts and the Probability of Bank Runs," *Journal of Finance* 40, 1293-1327.

Angeletos G.M. and I. Werning (2006) "Crises and Prices: Information Aggregation, Multiplicity and Volatility," *American Economic Review* 96, 1720-1736.

Keister, T. (2009) "Expectations and Contagion in Self-Fulfilling Currency Attacks," *International Economic Review* 50, 991-1012.

He Z. and W. Xiong (2012) "Dynamic Debt Runs," *Review of Financial Studies* 25, 1799-1843.

IV. Financial policy and regulation

(a) Government guarantees and bailouts

Gale, D. and X. Vives (2002) "Dollarization, Bailouts, and the Stability of the Banking System," *Quarterly Journal of Economics* 117, 467-502.

Gorton, G and L. Huang (2004) “Liquidity, Efficiency, and Bank Bailouts,” *American Economic Review* 94, 455-483.

Cooper, R., H. Kempf and D. Peled (2008) “Is it is or is it ain’t my obligation: Regional debt in a fiscal federation,” *International Economic Review* 49, 1469-1504.

Green, E.J. (2010) “Bailouts” Federal Reserve Bank of Richmond *Economic Quarterly* 96, 11-32.

Farhi, E. and J. Tirole (2012) “Collective Moral Hazard, Maturity Mismatch and Systemic Bailouts,” *American Economic Review* 102, 60-93.

Keister, T. (2016) “Bailouts and financial fragility,” *Review of Economic Studies* 83, 704-736.

Cooper, R. and Kempf, H. (2016) “Deposit Insurance and Bank Liquidation Without Commitment: Can We Sleep Well?” *Economic Theory* 61:365-392.

Bianchi, J. (2016), “Efficient Bailouts?” *American Economic Review* 106:3607-3659.

Mitkov, Y. (2017) “Inequality and Financial Fragility,” Working Paper, University of Bonn.

Allen, F., E. Carletti, I. Goldstein and A. Leonello (2017) “Government Guarantees and Financial Stability,” Working paper, September.

Davila, E. and I. Goldstein (2016) “Optimal Deposit Insurance,” Working paper.

(b) Capital and liquidity regulation

Farhi, E., M. Golosov and A. Tsyvinski (2009) “A Theory of Liquidity and Regulation of Financial Intermediation,” *Review of Economic Studies* 76, 973-992.

Kocherlakota, N. (2010) “Taxing risk and the optimal regulation of financial institutions,” Federal Reserve Bank of Minneapolis Economic Policy Paper 10-3.

Perotti, E. and Suarez, J. (2011) “A Pigouvian approach to liquidity regulation,” *International Journal of Central Banking*, 7, 3-41.

Stein, J.C. (2013) “Liquidity regulation and central banking,” Speech to the 2013 Credit Markets Symposium sponsored by the Federal Reserve Bank of Richmond, Charlotte, North Carolina, April 19.

I. Angeloni and E. Faia (2013) “Capital Regulation and Monetary Policy with Fragile Banks,” *Journal of Monetary Economics* 60, 311–324.

Kashyap, A., D. Tsomocos, and A. Vardoulakis (2017) “Optimal Bank Regulation In the Presence of Credit and Run Risk,” Working paper. August.

Diamond, D. and A. Kashyap (2016). “Liquidity Requirements, Liquidity Choice and Financial Stability,” NBER Working Paper 22053.

Li, Y. (2017) “Liquidity Regulation and Financial Stability,” Working paper, Nankai University.

(c) Information disclosure

Faria-e-Castro, M., J. Martinez and T. Philippon (2016) “Runs versus Lemons: Information Disclosure and Fiscal Capacity,” Working Paper, July.

(d) Other macroprudential policies

Hanson, S. Kashyap, A. and J. Stein (2010) “A Macroprudential Approach to Financial Regulation,” *Journal of Economic Perspectives* 25, 3-28.

Nosal J. and G. Ordonez (2013) “Uncertainty as Commitment,” *Journal of Monetary Economics* 80, 124-140.

Davila, E. and A. Korinek (2018) “Pecuniary Externalities in Economies with Financial Frictions,” *Review of Economic Studies* 85, 352–395.

Jeanne, O. and A. Korinek (2016) “Macroprudential Regulation Versus Mopping Up After the Crash,” JHU Working Paper.

V. Banking and crises in a macroeconomic setting

(a) Dynamic effects of banking crises

Ennis, H. and T. Keister (2003) “Economic Growth, Liquidity, and Bank Runs,” *Journal of Economic Theory* 109, 220-245.

Gertler, M. and N. Kiyotaki (2015) “Banking, Liquidity, and Bank Runs in an Infinite Horizon Economy,” *American Economic Review* 105, 2011-2043.

Gertler, M., N. Kiyotaki, and A. Prestipino (2016) “Wholesale Banking and Bank Runs in Macroeconomic Modeling of Financial Crises,” *Handbook of Macroeconomics*, Elsevier.

Sanches, D. (2017) “Banking Panics and Output Dynamics,” *Review of Economic Dynamics*, forthcoming.

Gertler, M., N. Kiyotaki, and A. Prestipino (2017) “A Macroeconomic Model with Financial Panics,” working paper.

(b) Banking crises and sovereign debt

Cooper, R. and K. Nikolov (2015). “Government debt and banking fragility: the spreading of strategic uncertainty,” NBER Working Paper, 19278 .

Farhi, E., & Tirole, J. (2016). “Deadly Embrace: Sovereign and Financial Balance Sheets Doom Loops,” Working Paper, November.

Leonello, A. (2015). “Government Guarantees and the Two-Way Feedback between Banking and Sovereign Debt Crises,” Working Paper.

(c) Other macroeconomic issues

Gertler, M. and P. Karadi (2011) “A Model of Unconventional Monetary Policy,” *Journal of Monetary Economics* 58, 17–34.

Coimbra, N. and H. Rey (2017) “Financial Cycles with Heterogeneous Intermediaries,” Working Paper, March.

VI. Money, banking and liquidity

(a) Trading frictions and liquidity

Kiyotaki, N. and J. Moore. (2005) “Liquidity and asset prices,” *International Economic Review* 46, 317-349

Williamson, S. and R. Wright (2010) “New Monetarist Economics: Methods,” *Federal Reserve Bank of St. Louis Review* 92, 265-302.

Williamson, S. and R. Wright (2011) “New Monetarist Economics: Models,” *Handbook of Monetary Economics*, vol. 3, Friedman and Woodford, eds.

Kiyotaki, N. and J. Moore. (2012) “Liquidity, Business Cycles, and Monetary Policy,” NBER Working Paper No. 17934.

Lagos, R., G. Rocheteau and R. Wright (2017) “Liquidity: A New Monetarist Perspective,” *Journal of Economic Literature* 55, 371–440.

(b) Money and banking

Diamond, D. and R. Rajan (2006) “Money in a Theory of Banking,” *American Economic Review* 96, 30-53.

Williamson, S. (2013) “Liquidity, monetary policy, and the financial crisis: A New Monetarist approach,” *American Economic Review* 102, 2570-2605.

Gu, C., F. Mattesini, C. Monnet and R. Wright (2013) “Banking: A New Monetarist approach,” *Review of Economic Studies* 80, 636-662.

Allen, F., E. Carletti, and D. Gale (2014) “Money, Financial Stability and Efficiency” *Journal of Economic Theory* 149, 100–127.

Brunnermeier, M., and Y. Sannikov (2014) “A macroeconomic model with a financial sector,” *American Economic Review* 104, 379-421.

Donaldson, J.R., G. Piacentino, and A. Thakor (2016) “Warehouse Banking,” *Journal of Financial Economics*, forthcoming.

VII. Bubbles

Harrison J. and D. Kreps, (1978), “Speculative Investor Behavior in a Stock Market with Heterogeneous Expectations,” *Quarterly Journal of Economics* 92, 323-336.

Tirole J. (1982), “On the Possibility of Speculation under Rational Expectations,” *Econometrica*, 50, 1163-1181.

Tirole, J (1985) “Asset Bubbles and Overlapping Generations,” *Econometrica* 53, 1499-1528.

Allen, F. and G. Gorton (1993) “Churning Bubbles,” *Review of Economic Studies* 60, 813-836.

Abreu, D and M. Brunnermeier (2003) “Bubbles and Crashes,” *Econometrica* 71, 173-204.

Hellwig, C and G. Lorenzoni (2009) “Bubbles and Self-Enforcing Debt,” *Econometrica* 77, 1137-1164.

Farhi, E. and J. Tirole (2012) “Bubbly Liquidity,” *Review of Economic Studies* 79, 678-706.

VII. Securitization and shadow banking

Diamond, D. (1989) “Reputation Acquisition in Debt Markets,” *Journal of Political Economy* 97, 828-862.

Sunderam, Adi (2012), “Money Creation and the Shadow Banking System,” *Review of Financial Studies* 28, 939-977.

Gennaioli, N. and Shleifer A., and R. Vishny (2013) “A Model of Shadow Banking,” *Journal of Finance* 68, 1331-1363

Ordonez, G. (2013). “Fragility of Reputation and Clustering of Risk-Taking,” *Theoretical Economics* 8, 653-700.

Ordonez G. (2017) “Sustainable Shadow Banking,” *AEJ Macroeconomics*, forthcoming.

Ordonez, G. and Piguillem, F. (2017). “Retirement in the Shadow (Banking),” UPenn Working Paper.

Moreira, A. and A. Savov (2017) “The Macroeconomics of Shadow Banking,” *Journal of Finance* 72, 2381-2431.