Financial Fragility: Theory and Mechanisms

Fernando Mendo

Course Information

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Classes: Tuesdays, Thursdays 11am-12.40pm. **Location:** Room F200/F202, PUC Rio.

Course Description

This half-semester course offers a rigorous exploration of the mechanisms through which financial systems become vulnerable to crises, focusing on how instability can emerge endogenously from rational behavior in the presence of liquidity risk, incomplete markets, and fragile intermediation structures. Students will study how liquidity provision through financial institutions can break down under stress, leading to phenomena such as bank runs, fire sales, and the propagation of shocks through interconnected balance sheets.

Topics include the classic Diamond-Dybvig model of liquidity insurance and its extensions, the propagation of shocks through interbank markets, and the consequences of incomplete markets for asset price dynamics. The course then turns to credit-fueled bubbles and their collapse, and ends this part with a study of contagion—how localized shocks can become systemic through balance sheet interdependence and strategic coordination failures.

Evaluation

Problem sets will constitute 85-90% of the final grade, with the remaining 10-15% based on class participation.

Textbooks

Main textbook

[AG] Franklin Allen and Douglas Gale, *Understanding Financial Crises*, Oxford University Press, 2009.

Additional (advanced) textbooks

Jean Tirole, *Illiquid Markets: Theory and Policy*, Princeton University Press, 2010.

Bengt Holmström and Jean Tirole, *Inside and Outside Liquidity*, The MIT Press, 2011.

Course Outline

1. **Intermediaries and Bank Runs**

   (a) **Panic runs.** Baseline banking model with idiosyncratic liquidity risk and no aggregate uncertainty. (i) autarky, (ii) asset market outcome, (iii) first-best outcome, (iv) banking solution: good equilibrium, unexpected **panic bank runs**, banks and asset markets, sunspots and expected panic bank runs.

   References: AG Ch.3, Diamond and Dybvig (1983); Goldstein and Pauzner (2005); Caballero and Krishnamurthy (2008); Postlewaite and Vives (1987); Rochet and Vives (2004); Morris and Shin (1998).

   (b) **Fundamental Runs.** Framework with aggregate uncertainty in aggregate productivity. Panic runs are ruled out; (expected) fundamental runs may still occur in low productivity states.

   References: AG Ch.3, Bryant (1980); Allen and Gale (1998); Chari and Jagannathan (1988); Gorton (1988); Jacklin and Bhattacharya (1988).

2. **Asset Markets and Price Volatility.** Framework with aggregate uncertainty in liquidity needs and no intermediaries. Cash-in-the-market pricing: small shifts in liquidity demand can trigger large asset price fluctuations. Extension with two agent types and entry decision: full- and limited-participation equilibria, and multiplicity analysis.

   References: AG Ch.4, Allen and Gale (1994).

3. **Intermediaries and asset markets.**

   (a) **Positive analysis.** Framework with aggregate risk in overall liquidity needs and exclusive bank participation in asset markets. We begin with: (i) a fundamental equilibrium without aggregate risk; (ii) an asymmetric equilibrium (safe vs. risky banks) under aggregate uncertainty; and (iii) an asymmetric sunspot equilibrium without aggregate fundamental risk. We then introduce idiosyncratic liquidity shocks to banks, prompting interbank trade at market-clearing prices. The module concludes with an equilibrium where only safe banks enter and bankruptcy is avoided.

   References: AG Ch.5, Allen and Gale (1998, 2000b); Bernanke and Gertler (1989a); Calomiris and Gorton (1991); Kiyotaki and Moore (1997).

(b) **Normative analysis.** Framework with two regions facing perfectly correlated liquidity shocks—i.e., no aggregate uncertainty about liquidity needs. We examine: (i) the first-best allocation, (ii) outcomes under local financial intermediation, (iii) intermediation with complete financial markets, (iv) intermediation with incomplete financial markets, and (v) incomplete contracts (under aggregate uncertainty in productivity), optimal default, and constrained efficiency.

References: AG Ch.6, Allen and Gale (2004).

4. **Bubbles and financial crises.** *(if time permits)*

References: AG Ch.9, Allen and Gale (1998); Gorton (1988); Allen and Gale (2000a); Brunnermeier and Oehmke (2013).

5. **Contagion.** *(if time permits)*

References: AG Ch.10, Allen and Gale (2000b); Rochet and Tirole (1996); Upper and Worms (2004).

Bibliography

ALLEN, F. and GALE, D. (1994). Limited market participation and volatility of asset prices. *American Economic Review*, **84** (4), 933–955.

— and — (1998). Optimal financial crises. *Journal of Finance*, **53** (4), 1245–1284.

— and — (2000a). Bubbles and crises. *Economic Journal*, **110** (460), 236–255.

— and — (2000b). Financial contagion. *Journal of Political Economy*, **108** (1), 1–33.

— and — (2004). Financial intermediaries and markets. *Econometrica*, **72** (4), 1023–1061.

BERNANKE, B. S. and GERTLER, M. (1989a). Agency costs, net worth, and business fluctuations. *American Economic Review*, **79** (1), 14–31.

— and — (1989b). Agency costs, net worth, and business fluctuations. *American Economic Review*, **79** (1), 14–31.

—, — and GILCHRIST, S. (1999). The financial accelerator in a quantitative business cycle framework. *Handbook of Macroeconomics*, **1**, 1341–1393.

BRUNNERMEIER, M. K. and OEHMKE, M. (2013). Bubbles, financial crises, and systemic risk. *Handbook of the Economics of Finance*, **2**, 1221–1288.

BRYANT, J. (1980). A model of reserves, bank runs, and deposit insurance. *Journal of Banking and Finance*, **4** (4), 335–344.

CABALLERO, R. J. and KRISHNAMURTHY, A. (2008). Collective risk management in a flight to quality episode. *Journal of Finance*, **63** (5), 2195–2230.

CALOMIRIS, C. W. and GORTON, G. (1991). The origins of banking panics: Models, facts, and bank regulation. *Financial Markets and Financial Crises*, pp. 109–174.

CARLSTROM, C. T. and FUERST, T. S. (1997). Agency costs, net worth, and business fluctuations: A computable general equilibrium analysis. *American Economic Review*, **87** (5), 893–910.

CHARI, V. V. and JAGANNATHAN, R. (1988). Banking panics, information, and rational expectations equilibrium. *Journal of Finance*, **43** (3), 749–760.

DIAMOND, D. W. and DYBVIG, P. H. (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy*, **91** (3), 401–419.

GOLDSTEIN, I. and PAUZNER, A. (2005). Demand-deposit contracts and the probability of bank runs. *Journal of Finance*, **60** (3), 1293–1327.

GORTON, G. (1988). Banking panics and business cycles. *Oxford Economic Papers*, **40** (4), 751–781.

JACKLIN, C. J. and BHATTACHARYA, S. (1988). Distinguishing panics and information-based bank runs: Welfare and policy implications. *Journal of Political Economy*, **96** (3), 568–592.

KIYOTAKI, N. and MOORE, J. (1997). Credit cycles. *Journal of Political Economy*, **105** (2), 211–248.

KYDLAND, F. E. and PRESCOTT, E. C. (1982). Time to build and aggregate fluctuations. *Econometrica*, **50** (6), 1345–1370.

LUCAS, R. E. (1977). Understanding business cycles. *Carnegie-Rochester Conference Series on Public Policy*, **5**, 7–29.

MORRIS, S. and SHIN, H. S. (1998). Unique equilibrium in a model of self-fulfilling currency attacks. *American Economic Review*, **88** (3), 587–597.

PLOSSER, C. I. (1989). Understanding real business cycles. *Journal of Economic Perspectives*, **3** (3), 73–90.

POSTLEWAITE, A. and VIVES, X. (1987). Bank runs as an equilibrium phenomenon. *Journal of Political Economy*, **95** (3), 485–491.

ROCHET, J.-C. and TIROLE, J. (1996). Interbank lending and systemic risk. *Journal of Money, Credit and Banking*, **28** (4), 733–762.

— and VIVES, X. (2004). Coordination failures and the lender of last resort: Was bagehot right after all? *Journal of the European Economic Association*, **2** (6), 1116–1147.

UPPER, C. and WORMS, A. (2004). Estimating bilateral exposures in the german interbank market: Is there a danger of contagion? *European Economic Review*, **48** (4), 827–849.

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