

INCOMPLETE MARKETS, FINANCIAL FRICTIONS AND CRISES

This mini-course studies a quantitative dynamic stochastic general equilibrium (DSGE) framework with financial frictions and incomplete asset markets that can be used in a wide class of macroeconomic models, particularly those aiming to explain phenomena like credit booms and financial crises. The course blends elements of real business cycle models, asset pricing models, and models with incomplete asset markets and credit constraints. Good understanding of the material usually covered in first-year Ph.D. Macro and Micro courses, particularly stochastic dynamic programming, recursive macroeconomic theory and general equilibrium analysis, provide useful background, as well as some understanding of computing software and the numerical methods used to solve DSGE models. In addition, since several of the applications covered in the course focus on open-economy models, some familiarity with International Macro also be helpful.

The course begins with a quick review of workhorse models in International Macro, followed by a canonical representative-agent RBC framework for economies that face stochastic, non-insurable shocks. The course explores then how this framework can be modified and enriched to study financial crises and sudden reversals of capital inflows driven by capital market imperfections. We focus in particular on models that feature Irving Fisher's debt-deflation mechanism of financial amplification, examining both its positive and normative implications, and its connection with informational frictions that can lead to credit booms and crashes. The course then moves to relax the representative agent assumption by introducing heterogeneous agents. We study how open-economy DSGE models with heterogeneous agents and incomplete markets can shed new light on important issues like the effects of financial globalization on the formation of the so-called "global imbalances," including large changes in net foreign asset positions and the determination of gross and net portfolios of international asset holdings. We close by showing how this framework for modeling global imbalances can also be extended to incorporate credit frictions and explain financial crises.

The reading list below includes a set of required readings, which are the ones that the lectures follow more closely, and a very incomplete set of additional suggested readings for the various topics. There are also four reference texts that can be helpful to follow up on theoretical and empirical topics.

Reference Texts:

- AM** Arellano, Cristina and Mendoza, Enrique G., "Credit Frictions and 'Sudden Stops' in Small Open Economies: An Equilibrium Business Cycle Framework for Emerging Markets Crises," in *Dynamic Macroeconomic Analysis: Theory and Policy in General Equilibrium*, ed. by S. Altug, J. Chadha and J. Nolan, Cambridge University Press, 2003.
- OR** Obstfeld, Maurice & K. Rogoff, *Foundations of Intl. Macroeconomics*, MIT Press 1996.
- RR** Reinhart, Carmen M. & Kenneth Rogoff, *This Time is Different: Eight Centuries of Financial Folly*, Princeton Univ. Press.
- SL** Ljungqvist, Lars & Sargent, Thomas J., *Recursive Macroeconomic Theory*, MIT Press, 2004.

I.- Workhorse Models

Required readings:

- Blanchard, O. and Fischer S. *Lectures on Macroeconomics*, section 2.4 and Ch.2 appendix C
- Mendoza, E. "Real Business Cycles in a Small Open Economy," *American Economic Review*, 1991
- SL** chs. 8, 16 and 17

Reference: OR 1.1, 1.2, 1.3, 2.1, 2.2, and ch. 5;

Additional references:

Aguiar M. and G. Gopinath, 2007, "Emerging Market Business Cycles: The Cycle Is the Trend," *Journal of Political Economy* 115(1): 69-102.

Boz, E., C. Daude, and C. B. Durdu, "Emerging Market Business Cycles Revisited: Learning about the Trend," Board of Governors of the Federal Reserve, Intl. Finance Discussion Paper No. 2008-927,

Mendoza, E., "Capital Controls and the Gains from Trade in a Business Cycle Model of a Small Open Economy," *IMF Staff Papers*, 1991

Neumeyer, P.A. and F. Perri, "Business Cycles in Emerging Economies: The Role of Interest Rates," *JME*, 2005.

Schmitt-Grohe, S., and M. Uribe (2003), "Closing small open economies," *J. of Int. Econ*, 61, 163-185.

II.- Fisherian Deflation, Financial Crises and Sudden Stops

Required readings:

Bianchi, J, and Mendoza E., "Overborrowing, Financial Crises and 'Macro-prudential' Taxes," NBER WP No. 16091, 2010, available at: <http://www.nber.org/papers/w16091>

Boz. E. and E. Mendoza, 2010, "Financial Innovation, the Discovery of Risk, and the U.S. Credit Crisis," mimeo, University of Maryland, available at: <http://econweb.umd.edu/~mendoza/wp/w16020.pdf>

Durdu, C.B. and Mendoza E. , "Are Asset Price Guarantees Useful for Preventing Sudden Stops?: A Quantitative Investigation of the Globalization Hazard Moral Hazard Tradeoff," *JIE*, 2006. Available at <http://www.econ.umd.edu/~mendoza/pp/JIE06Durdu.pdf>

Durdu, C.B., Mendoza, E. and Terrones, M., "Precautionary Demand for Foreign Assets in Sudden Stop Economies: An Assessment of the New Mercantilism," forthcoming, *JDE* 2009., available at http://econweb.umd.edu/~mendoza/pp/Precautionary_durdu_terrones.pdf

Mendoza, E. and K. Smith, "Quantitative Implications of a Debt-Deflation Theory of Sudden Stops and Asset Prices," *JIE*, 2006. <http://www.econ.umd.edu/~mendoza/pp/JIE06smith.pdf>

Mendoza, E., "Sudden Stops, Financial Crises and Leverage," forthcoming, *American Economic Review*, NBER WP, 2008 . <http://econweb.umd.edu/~mendoza/pp/CompletePaperRevforDistribution.pdf>

Mendoza, E. "Real Exchange Rate Volatility and the Price of Nontradables in Sudden-Stop Prone Economies," *Economia*, vol. 6, no. 1, Fall 2005.

Mendoza, E. "Lessons from the Debt-Deflation Theory of Sudden Stops," *AER*, Pap. & Proc., May, 2006

Mendoza, E. and M. Terrones, "An Anatomy of Credit Booms: Evidence From Macro Aggregates and Micro Data," Board of Governors of the Federal Reserve, International Finance Disc. Paper, 2008-936 July 2008. Available at <http://www.econ.umd.edu/~mendoza/wp/w14049.pdf>

Reference texts: RR, AM (also as NBER WP # w8880, 2002, available at <http://www.econ.umd.edu/~mendoza/pp/w8880.pdf>).

Additional references:

Bernanke, B., M. Gertler, and S. Gilchrist (1999):, "The financial accelerator in a quantitative business cycle model," in *Handbook of Macroeconomics*, ed. by J. Taylor, and M. Woodford.

Caballero, R. and A. Krishnamurthy, "International and Domestic Collateral Constraints in a Model of Emerging Market Crises," *Journal of Monetary Economics*, 2001.

Calvo, G.A., "Capital Flows and Capital-Market Crises: The Simple Economics of Sudden Stops," *Journal of Applied Economics*, v. 1, pp. 35-54, 1998

Calvo, G. and Mendoza, E. "Capital Markets Crises and Economic Collapse in Emerging Markets: An Informational Frictions Approach," *American Economic Review*, May 2000.

Calvo, G. and E. Mendoza "Rational Contagion and the Globalization of Securities Markets," *Journal of International Economics*, June 2000

Cook, D. and M. Devereux, "Accounting for the East Asian Crisis: A Quantitative Model of Capital Outflows in Small Open Economies," *JIE* 2006.

Gertler, M., S. Gilchrist, and F. Natalucci (2007), "External constraints on monetary policy and the financial accelerator," *Journal of Money Credit and Banking*.

Gertler, M. and N. Kiyotaki, (2009), "Financial Intermediation and Credit Policy in Business Cycle Analysis," mimeo, NYU.

Korinek, Anton, "Excessive Dollar Borrowing in Emerging Markets: Balance Sheet Effects and Macroeconomic Externalities," mimeo, Univ. of Maryland, 2007

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

Mendoza, E. "The Benefits of Dollarization when Stabilization Policy Lacks Credibility and Financial Markets are Imperfect," *Journal of Money, Credit, and Banking*, 2001.

Mendoza, E. "Credit, Prices, and Crashes: Business Cycles with a Sudden Stop," in *Preventing Currency Crises in Emerging Markets*, ed. by S. Edwards and J. Frankel, Univ. of Chicago Press, 2002, also NBER WP no. w8338, 2001.

III.- Global Imbalances, Financial Development & Heterogeneous Agents

Required readings:

Mendoza, E., V. Quadrini, and J. V. Rios-Rull, "Financial Integration, Financial Development and Global Imbalances," *Journal of Pol. Econ.*, at <http://econweb.umd.edu/~mendoza/pp/JPEreprint.pdf>

Mendoza, E., V. Quadrini, and J. V. Rios-Rull, "On the Welfare Implications of Financial Globalization without Financial Development," *International Seminar on Macroeconomics Annual*, R. Clarida & F. G. Giavazzi, eds. available at <http://econweb.umd.edu/~mendoza/pp/Welfarefinancialintegration.pdf>

Mendoza, E. and V. Quadrini, "Financial Globalization, Financial Crises and Contagion," *Journal of Monetary Economics*, January 2010, available at <http://econweb.umd.edu/~mendoza/pp/JME2010.pdf>

Additional references:

Backus, D., Henriksen, E., Lambert, F., & Telmer, C. (2005). "Current Account Fact and Fiction," mimeo NYU.

Benigno, P, "Are Valuation Effects Desirable from a Global Perspective?," NBER WP 12219, 2006.

Bernanke, B. (2005). The global saving glut and the U.S. current account deficit. Speech at the Sandridge Lecture, Virginia Association of Economists, March 10, 2005.

Blanchard, O., Giavazzi, F., and Sa, F. (2005). The U.S. current account deficit and the dollar. NBER Working Paper No. 11137.

Caballero, R. J., Farhi, E., & Gourinchas, P. O., "An Equilibrium Model of "Global Imbalances" and Low Interest Rates," *AER* 2008.

Devereux, M. and A. Sutherland, "Solving for Country Portfolios in Open Economy Macro Models," mimeo, Dept. of Economics, Univ. of British Columbia

Engel, C. and Rogers, J. H. (2006). The U.S. current account deficit and the expected share of world output. Board of Governors of the Federal Reserve System, International Finance Disc. Papers No. 856.

IMF, "Global Imbalances: A Saving, Investment Perspective" *World Econ. Outlook*, Ch. 2, Sept. 2005.

Martin, P. and H. Rey, "Financial Globalization With or Without Crash?," *AER* 2007.

McGrattan, E. R. and Prescott, E. C. (2007). Technology capital and the U.S. current account. Federal Reserve Bank of Minneapolis, Staff Report 406.

Van Wincoop, E. and C. Tille, "International Capital Flows," mimeo, University of Virginia.

Willen, P. S. (2004). "Incomplete Markets and Trade". WP No. 04-8, Federal Reserve Bank of Boston.