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**QUANTITATIVE MODELS OF FINANCIAL CRISES AND MACROPRUDENTIAL REGULATION**  
**(MODELOS CUANTITATIVOS DE CRISIS FINANCIERAS Y REGULACION MACROPRUDENCIAL)**

This course studies financial crises and macroprudential policies from the perspective of a quantitative dynamic stochastic general equilibrium (DSGE) framework that emphasizes financial frictions and incomplete markets of contingent claims. From a methodological perspective, the course focuses on the use of global, nonlinear solution methods that are necessary for solving models in which market incompleteness and financial frictions are “essential,” in the sense that they affect macroeconomic dynamics as well as long-run distributions of wealth and asset holdings. The seminar blends elements of Real Business Cycle Theory, International Finance and Asset Pricing Theory and it relies heavily on Recursive Macroeconomic Theory. A thorough understanding of the material covered in the first-year Ph.D. Macro and Micro courses, particularly stochastic dynamic programming and general equilibrium analysis, provide useful background. Knowledge of computational methods and software used in Macro modeling and familiarity with principles of International Macroeconomics are also helpful.

The course begins with a review of canonical perfect foresight models of a small open economy, followed by a representative-agent RBC framework in which a small open economy faces stochastic, non-insurable shocks. This is followed by an exploration of the use of global methods for solving incomplete markets models of small open economies using a canonical example for an endowment economy. The seminar 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. The seminar then moves to examine the normative implications of a large class of financial frictions models driven by credit constraints linked to asset prices, with particular focus on macroprudential policies.

**Suggested Reference material:**

- 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.
- CV** Carlos A. Végh *Open Economy Macroeconomics in Developing Countries*, MIT Press, 2013
- OR** Obstfeld, M. & 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, 2012.

**I.- Workhorse Models**

**Main readings:**

Blanchard, O. and Fischer S. *Lectures on Macroeconomics*, section 2.4 and Ch.2 appendix C  
**SL** chs. 8, 16 and 17 (indexed from the second edition, chapter nos. may have changed)

**Reference:** **OR** 1.1, 1.2, 1.3, 2.1, 2.2, and ch. 5; **CV** Chs. 1, 3, 4

**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.

Backus, D. "Interpreting Comovements in the Trade Balance and the Terms of Trade," *Journal of International Economics*, 1993.

Boz, E., C. Daude, and C. B. Durdu, 2011, "Emerging Market Business Cycles Revisited: Learning about the Trend," *Journal of Monetary Economics*, vol. 58(6), pages 616-631

Cole, H.L. and Obstfeld, M., "Commodity Trade and International Risksharing," *Journal of Monetary Economics*, 1991.

Lane, P. and G. M. Milesi-Ferretti, 2007. "The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970-2004," *J. of International Econ*, vol. 73(2), pages 223-250.

Mendoza, E. "Real Business Cycles in a Small Open Economy," *American Economic Review*, 1991

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

Mendoza, E., G. "The Robustness of Macroeconomic Indicators of Capital Mobility," in *Capital Mobility*, L. Leiderman and A. Razin eds., Cambridge Univ. Press., 1994. Available at: <http://www.sas.upenn.edu/~egme/pp/sapir.pdf>

Mendoza, E. G, "The Terms of Trade, the Real Exchange Rate and Economic Fluctuations," *International Economic Review*, 1995. Available at: <http://www.sas.upenn.edu/~egme/pp/IER95.pdf>

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.- Financial Crises, Sudden Stops and Macroprudential Regulation

### Main readings:

Bianchi, J. , E. Boz and E. Mendoza, 2012, "Macroprudential Policy in a Fisherian Model of Financial Innovation," *IMF Economic Review*, <http://www.sas.upenn.edu/~egme/pp/imfer20129a.pdf>

Bianchi, J. and E. Mendoza, 2013, "Optimal, Time-Consistent Macroprudential Policy," NBER Working Paper no. w19704 (<http://www.sas.upenn.edu/~egme/wp/w19704.pdf> ).

Boz, E. and E. Mendoza, 2014, "Financial Innovation, the Discovery of Risk, and the U.S. Credit Crisis," *Journal of Monetary Economics*, (<http://www.sas.upenn.edu/~egme/pp/BozMendozaJME.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.sas.upenn.edu/~egme/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," *JDE* 2009, available at [http://www.sas.upenn.edu/~egme/pp/Precautionary\\_durdu\\_terrones.pdf](http://www.sas.upenn.edu/~egme/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.sas.upenn.edu/~egme/pp/JIE06Smith.pdf>

Mendoza, E., "Sudden Stops, Financial Crises and Leverage," *American Economic Review*, Dec. 2010, <http://www.sas.upenn.edu/~egme/pp/CompletePaperRevforDistribution.pdf>; working paper version NBER WP, 2008 at <http://www.nber.org/papers/w14444>

Mendoza, E. and M. Terrones, "An Anatomy of Credit Booms and their Demise," NBER Working Paper no. 18379, 2012 Available at <http://www.sas.upenn.edu/~egme/wp/w18379.pdf>

**Reference texts:** RR, CV Ch. 2, 16, 17, AM (also as NBER WP # w8880, 2002, available at <http://www.sas.upenn.edu/~egme/pp/w8880.pdf> ).

### Additional references:

Adrian, T. and H. S. Shin, 2013, "Procyclical Leverage and Value-at-Risk," mimeo, Princeton, forthcoming, *Review of Financial Studies*.

Benigno, G., H. Chen, C. Otrok, A. Rebucci & E. Young, 2013, "Capital Controls or Real Exchange Rate Policy? A Pecuniary Externality Perspective," Research Dept. Publications IDB-WP-393, Inter-American Dev. Bank.

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.

Bianchi, J. "Overborrowing and Systemic Externalities in the Business Cycle" *American Economic Review*, 2011.

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

Calvo, G., Izquierdo, A. and L. Mejia, "On the Empirics of Sudden Stops: The Relevance of Balance-Sheet Effects," mimeo, Inter-American Development Bank, 2004.

Choi, W. G. and D. Cook, "Liability Dollarization and the Bank Balance Sheet Channel," *JIE*, 2003.

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

Galati, G. and R. Moesner, 2011, "Macroprudential policy – a literature review," BIS Working Papers No 337.

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, 2010, "Financial Intermediation and Credit Policy in Business Cycle Analysis," in *Handbook of Monetary Economics*, B. Friedman and M. Woodford eds., Elsevier, vol. 3, no. 3.

Gertler, M. and N. Kiyotaki, 2013, "Banking, Liquidity and Bank Runs in an Infinite Horizon Economy," mimeo, NYU

Gertler, M. and P. Karadi, 2012, "A Framework for Analyzing Large Scale Asset Purchases as a Monetary Policy Tool," mimeo, NYU

Iacoviello, M. 2005. "House Prices, Borrowing Constraints, and Monetary Policy in the Business Cycle," *AER*, vol. 95(3), pages 739-764, June.

Jermann, Urban & Vincenzo Quadrini, 2012. "Macroeconomic Effects of Financial Shocks," *AER*, v. 102, no. 1, 238-271, February.

Korinek, A. and Enrique G. Mendoza (2014), "From Sudden Stops to Fisherian Deflation: Quantitative Theory and Policy Implications. *ARE* forthcoming, <http://www.sas.upenn.edu/~egme/wp/w19362.pdf>

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

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

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. "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.

Mendoza, E. and Uribe, M. "Devaluation Risk and the Business Cycle Implications of Exchange Rate Management," Carnegie-Rochester Conference Series in Public Policy, 2001. Available at <http://www.sas.upenn.edu/~egme/pp/CRCS00.pdf>

Paasche, B. "Credit Constraints and International Financial Crises," *JME*, 2001.

Schimtt-Grohe, S. and M. Uribe, "Currency Pegs, Downward Nominal Wage Rigidity, Unemployment, and Macro Prudential Policy", [http://www.columbia.edu/~mu2166/dnwr\\_pegs\\_iu/paper.pdf](http://www.columbia.edu/~mu2166/dnwr_pegs_iu/paper.pdf)

Stein, Jeremy, "Monetary Policy as Financial-Stability Regulation," *Quarterly Journal of Economics* 127, no. 1: 57-95.

Uribe, M. "Individual Versus Aggregate Collateral Constraints and the Overborrowing Syndrome," 2006.