Economics 202A
Macroeconomics
Fall 2022

Syllabus
August 15, 2022

Instructor:

Jón Steinsson (jsteinsson@berkeley.edu)
Office hours: Tuesdays 1pm-2pm in my office (Evans 671) (May Change)
These office hours are dedicated to graduate students.
Please also feel free to email me if that time does not work for you.

Graduate Student Instructor:

Sharath Sonti (sharath_sonti@berkeley.edu) – First half of semester

Ethan McClure (ethanmlmcclure@berkeley.edu) – Second half or semester

Course Description:

This is the first of two courses in the 1st year core macroeconomic sequence of the PhD program in Economics at UC Berkeley.

The class will cover a variety of topics in macroeconomics: economic growth, production, consumption, investment, asset pricing, and financial frictions.

The course will seek to balance discussions of theory, model solution methods, empirical results, and empirical methodology. I will strive to make the course useful and interesting both for students intending to do macro as a field and also students interested in other fields.

Problem Sets:

There will be eight or nine problem sets. You may work on these in small groups, but you must each hand in a separate solution. These problem sets will together count for 33% of the class grade (with the computational problem sets towards the end of the semester counting more than the others). The GSIs will grade the problem sets.

Exams:

The midterm exam will be held during the week of October 11th.

The final exam will be at 9:00 on December 6th (i.e., during reading week).

I will grade the midterm exam and the final exam.

Course Grade:

The course grade will be determined as follows:

- Midterm exam 33%
- Final exam 33%
- Problem sets 33%

Lectures:

Lectures will be given in Evans Hall 648 Tuesdays and Thursdays between 9:00am and 10:30am.

Readings:

Readings marked "*" are required. Readings marked "(*)" are encouraged. The other readings are recommended background readings for students interested in the topic.

Readings marked CW are on the course website.

The main textbooks for the course are:

Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY.

Acemoglu, D. (2009): *Introduction to Modern Economic Growth*, Princeton University Press, Princeton, NJ.

We will extensively discuss empirical work that makes use of regression analysis, instrumental variables, differences-in-differences, and regression discontinuities. If your command of these methods is rusty or worse, I recommend that you read:

Angrist, J.D., and J.-S. Pischke (2015): *Mastering Metrics*, Princeton University Press, Princeton, NJ.

This is a low-tech book that should quickly bring you up to speed conceptually. It is also a fun read. You will learn the technical details in 240A/B.

Before the first class please read:

*Baldiga Coffman, K. (2014): "Evidence on Self-Stereotyping and the Contribution of Ideas," *Quarterly Journal of Economics,* 129, 1625-1660. [Introduction only] (CW)

1 Capital Accumulation and Economic Growth

1.1 Background: Malthusian Stagnation and the Industrial Revolution

Steinsson, J. (2021): "Malthus and Pre-Industrial Stagnation," draft textbook chapter. https://eml.berkeley.edu/~jsteinsson/teaching/malthus.pdf

Steinsson, J. (2021): "How Did Growth Begin? The Industrial Revolution and Its Antecedents," draft textbook chapter. https://eml.berkeley.edu/~jsteinsson/teaching/originsofgrowth.pdf

Bouscasse, P., E. Nakamura, J. Steinsson (2021): "When Did Growth Begin? New Estimates of Productivity Growth in England from 1250 to 1870," Working Paper, University of California, Berkeley. https://eml.berkeley.edu/~jsteinsson/papers/malthus.pdf

1.2 The Solow Growth Model

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 1.1-1.6]

Jones, C. (2016): "The Facts of Economic Growth," *Handbook of Macroeconomics*, Vol. 2, p. 3-69.

Acemoglu, D. (2009): *Introduction to Modern Economic Growth*, Princeton University Press, Princeton, NJ. [Chapter 2]

Barro, R.J. and X. Sala-i-Martin (2004): *Economic Growth*, MIT Press, Cambridge, MA. [Chapters 1, 11 and 12]

Easterly, W.R. (2002): *Elusive Quest for Growth*, Cambridge: MIT Press.

Mankiw, N.G., D. Romer, D.N. Weil (1992): "A Contribution to the Empirics of Economic Growth," *Quarterly Journal of Economics*, 107, 407-437.

Kremer, M., J. Willis, Y. You (2021): "Converging to Convergence," NBER Working Paper No. 29484.

1.3 The Neoclassical Growth Model

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 2.1-2.7]

Acemoglu, D. (2009): *Introduction to Modern Economic Growth*, Princeton University Press, Princeton, NJ. [Chapter 8]

Barro, R.J. and X. Sala-i-Martin (2004): *Economic Growth*, MIT Press, Cambridge, MA. [Chapters 2 and 3 and Appendix A.3]

Obstfeld, M. (1992): "Dynamic Optimization in Continuous-Time Economic Models (A Guide for the Perplexed), Unpublished Paper, U.C. Berkeley. (CW)

Gourinchas, P.O. (2015): "Notes for Econ 202A: The Ramsey-Cass-Koopmans Model," Unpublished notes, U.C. Berkeley. (CW)

2 Proximate and Deeper Causes of Growth

2.1 Growth Accounting

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 1.7]

*Jones, C. (2016): "The Facts of Economic Growth," *Handbook of Macroeconomics*, Vol. 2, p. 3-69. [Section 2.1]

*Barro, R.J. and X. Sala-i-Martin (2004): *Economic Growth*, MIT Press, Cambridge, MA. [Chapter 10.1, 10.2, 10.5] (CW)

Hsieh, C.T. (2002): "What Explains the Industrial Revolution in East Asia? Evidence from the Factor Markets," *American Economic Review*, 92, 502-526.

Fernald, J. and B. Neiman (2011): "Growth Accounting with Misallocation: Or, Doing Less with More in Singapore," *American Economic Journal: Macroeconomics*, 3, 29-74.

Philippon, T. (2022): "Additive Growth," NBER Working Paper No. 29950.

Acemoglu, D. (2009): *Introduction to Modern Economic Growth*, Princeton University Press, Princeton, NJ. [Chapter 3.1]

2.2 Development Accounting

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 4.1-4.2]

*Jones, C. (2016): "The Facts of Economic Growth," *Handbook of Macroeconomics*, Vol. 2, p. 3-69. [Section 4.5]

*Caselli, F. (2005): "Accounting for Cross-Country Income Differences," *Handbook of Economic Growth*, Vol 1.A., p. 679-741. [Sections 1-2]

Hsieh, C.-T. and P.J. Klenow (2010): "Development Accounting," *American Economic Journal: Macroeconomics*, 2, 207-223.

Feenstra, R.C., R. Inklaar, and M.P. Timmer (2015): "The Next Generation of the Penn World Table," *American Economic Review*, 105, 3150-3182.

Lucas, R.E. (1990): "Why Doesn't Capital Flow from Rich to Poor Countries?" *American Economic Review*, 80(2), 92-96.

Caselli, F. and J. Feyrer (2007): "The Marginal Product of Capital," *Quarterly Journal of Economics*, 122, 535-568.

Gollin, D., D Lagakos, M.E. Waugh (2014): "The Agricultural Productivity Gap," *Quarterly Journal of Economics*, 129, 939-993.

Acemoglu, D. (2009): *Introduction to Modern Economic Growth*, Princeton University Press, Princeton, NJ. [Chapter 3.5]

2.3 Fundamental Determinants of Growth (May Skip)

*Rodrik, D., A. Subramanian, F. Trebbi (2004): "Institutions Rule: The Primacy of Institutions over Geography and Integration in Development," *Journal of Economic Growth*, 9, 131-165.

*Jones, B.F. and B.A. Olken (2005): "Do Leaders Matter? National Leadership and Growth since World War II," *Quarterly Journal of Economics*, 120(3), 835-864.

Sachs, J. (2003): "Institutions Don't Rule: Direct Effects of Geography on Per Capita Income," NBER Working Paper No. 9490.

Bazzi, S. and M.A. Clemens (2013): "Blunt Instruments: Avoiding Common Pitfalls in Identifying the Causes of Economic Growth," *American Economic Journal: Macroeconomics*, 5, 152-186.

Acemoglu, D., S. Naidu, P. Restrepo, J.A. Robinson (2019): "Democracy Does Cause Growth," *Journal of Political Economy*, 127, 47-100.

Glaeser, E., R. LaPorta, F.L. de Silanes, and A. Shleifer (2004): "Do Institutions Cause Growth?" *Journal of Economic Growth*, 9, 271-303.

Acemoglu, D., S. Johnson and J. Robinson (2001): "The Colonial Origins of Comparative Development: An Empirical Analysis," *American Economic Review*, 91(5), 1369-1401.

Acemoglu, D., S. Johnson and J. Robinson (2002): "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," *Quarterly Journal of Economics*, 117(4), 1231-1294.

Acemoglu, D., D. Cantoni, S. Johnson and J. Robinson (201): "The Consequences of Radical Reform: The French Revolution," *American Economic Review*, 101, 3286-3307.

3 Technical Change and Growth

3.1 Ideas and Growth

*Jones, C.I. (2019): "Paul Romer: Ideas, Nonrivalry, and Endogenous Growth," *Scandinavian Journal of Economics*, 121(3), 859-883.

*Jones, C.I. (2021): "Past and Future of Economic Growth: A Semi-Endogenous Growth Perspective," Working Paper, Stanford University.

(*)Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 3]

(*)Jones, C.I. (2005): "Growth and Ideas," *Handbook of Economic Growth*, Vol. 1B, 1063-1111.

3.2 The Expanding Variety Model

*Acemoglu, D. (2009): *Introduction to Modern Economic Growth*, Princeton University Press, Princeton, NJ. [Chapter 12.3-12.4 and Chapters 13.1-13.2]

(*)Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 3.5]

(*)Jones, C.I. (2005): "Growth and Ideas," *Handbook of Economic Growth*, Vol. 1B, 1063-1111.

Barro, R.J. and X. Sala-I-Martin (2004): *Economic Growth*, MIT Press, Cambridge, MA. [Chapter 6]

3.3 Creative Destruction: The Quality Ladder Model

*Acemoglu, D. (2009): *Introduction to Modern Economic Growth*, Princeton University Press, Princeton, NJ. [Chapters 14.1]

Barro, R.J. and X. Sala-i-Martin (2004): *Economic Growth*, MIT Press, Cambridge, MA. [Chapter 7]

3.4 Directed Technical Change (May Skip)

*Acemoglu, D. (2009): *Introduction to Modern Economic Growth*, Princeton University Press, Princeton, NJ. [Chapters 15]

Acemoglu, D. (2002): "Directed Technical Change," *Review of Economic Studies*, 69, 781-809.

3.5 Automation and the Future of Work (May Skip)

*Acemoglu, D. and P. Restrepo (2018): "The Race Between Man and Machine: Implications of Technological Growth, Factor Shares, and Employment," *American Economic Review*, 108(6), 1488-1542.

4 Economic Growth: Additional Topics

4.1 Misallocation (May Skip)

*Hsieh, C.T. and P.T. Klenow (2009): "Misallocation and Manufacturing TFP in China and India," *Quarterly Journal of Economics*, 124, 1403-1448.

Restuccia, D. and R. Rogerson (2008): "Policy Distortions and Aggregate Productivity with Heterogeneous Plants," *Review of Economic Dynamics*, 11, 707-720.

Midrigan, V. and D.Y. Xu (2014): "Finance and Misallocation: Evidence from Plant-Level Data," *American Economic Review*, 104, 422-458.

Buera, F.J., J.P. Kaboski, and Y. Shin (2011): "Finance and Development: A Tale of Two Cities," *American Economic Review*, 101, 1964-2002.

Rotemberg, M. and T.K. White (2021): "Plants-to-Table(s and Figures): Processed Manufacturing Data and Measured Misallocation, Working Paper, New York University.

Huneeus, F. and I.S. Kim (2021): "The Effects of Firms' Lobbying on Resource Misallocation," Working Paper, Central Bank of Chile.

4.2 Climate Change (May Skip)

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 1.8]

Weitzman, M. (2009): "On Modelling and Interpreting the Economics of Catastrophic Climate Change," *Review of Economics and Statistics*, 91(1), 1-19.

Dell, M., B.F. Jones, and B.A. Olken (2014): "What Do We Learn from the Weather? The New Climate-Economy Literature," *Journal of Economic Literature*, 52, 740-798.

Burke, M., S.M. Hsiang, E. Miguel (2015): "Global Non-Linear Effect of Temperature on Economic Production," *Nature*, 10.1038/nature15725.

Nordhaus, W. (2013): "Integrated Economic and Climate Modeling," *Handbook of Computable General Equilibrium Modeling*, Volume 1, 1069-1131.

Acemoglu, D., U. Akcigit, D. Hanley, W. Kerr (2016): "Transition to Clean Technology," *Journal of Political Economy*, 124, 52-104.

5 The Overlapping Generations Model

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 2.8-2.12]

*Blanchard, O.J. and S. Fischer (1989): Lectures on Macroeconomics, MIT Press, Cambridge, MA. [Chapter 4.1]

(*)Blanchard, O.J. and S. Fischer (1989): Lectures on Macroeconomics, MIT Press, Cambridge, MA. [Chapter 3.1-3.2]

Blanchard, O.J. (2019): "Public Debt and Low Interest Rates," *American Economic Review*, 109, 1197-1229.

6 Consumption

6.1 Basic Permanent Income Model

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 8.1-8.2]

*Krusell, P. (2015): Real Macroeconomic Theory, manuscript. [Chapter 4] (CW)

*Jappelli, T. and L. Pistaferri (2010): "The Consumption Response to Income Changes," Annual Review of Economics, 2, 479-506. [Sections 1 and 2]

Sims, C. (2000): "Stochastic Lagrange Multipliers for Problems with Lagged Expectations," Lecture Notes. (CW)

Sims, C. (2006): "Random Lagrange Multipliers and Transversality," Lecture Notes. (CW)

Stokey, N.L., R.E. Lucas, with E.C. Prescott (1989): *Recursive Methods in Economic Dynamics*, Harvard University Press, Cambridge, MA. [Especially ch. 2.1, 3, and 4]

Ljungqvist, L., and T.J. Sargent (2018): Recursive Macroeconomic Theory, Cambridge, MA, MIT Press. [Especially ch. 3 and 4]
Modigliani, F. (1986): "Life Cycle, Individual Thrift, and the Wealth of Nations," *American Economic Review*, 76(3), 297-313. (Nobel Lecture)

6.2 The Response of Consumption to Income

*Jappelli, T. and L. Pistaferri (2010): "The Consumption Response to Income Changes," Annual Review of Economics, 2, 479-506. [Sections 3 and 4]
*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 8.3]
*Campbell, J.Y., and N.G. Mankiw (1989): "Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence," *NBER Macroeconomics Annual*, 4, 185-216. [Section 1]
*Parker, J.A., N. Souleles, D. Johnson, and R. McClelland (2012): "Consumer Spending and the Economic Stimulus Payments of 2008," *American Economic Review*, 103(6), 2530-2553.
Hsieh, C.T. (2003): "Do Consumers React to Anticipated Income Shocks? Evidence from the Alaska Permanent Fund," *American Economic Review*, 93, 397-405.
Kueng, L. (2015): "Revisiting the Response of Household Spending to Alaska Permanent Fund Dividend using CE Data," Working Paper, Northwestern University.
Ganong, P., D. Jones, P.J. Noel, F.E. Greig, D. Ferrell, and C. Wheat (2020): "Wealth, Race, and Consumption Smoothing of Typical Income Shocks," NBER Working Paper No. 27552.
Fuchs-Schuendeln, N. and T.A. Hassan (2015): "Natural Experiments in Macroeconomics," NBER Working Paper No. 21228.

6.3 Precautionary Savings, Liquidity Constraints, and Self-Control

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 8.6-8.7]
*Angeletos, G.M., D. Laibson, A. Repetto, J. Tobacman, S. Weinberg (2001): "the Hyperbolic Consumption Model: Calibration, Simulation, and Empirical Evidence," *Journal of Economic Perspectives*, 15(3), 47-68.
Attanasio, O.P., G. Weber (2010): "Consumption and Saving: Models of Intertemporal Allocation and Their Implications for Public Policy," *Journal of Economic Literature*, 48, 693-751.
Attanasio, O.P., M. Browning (1995): "Consumption over the Life-Cycle and Business Cycle," *American Economic Review*, 85, 1118-1137.
Carrol, C.D., L.H. Summers (1991): "Consumption Growth Parallels Income Growth: Some New Evidence," in National Saving and Economic Performance, ed. B.D. Bernheim and J.B. Shoven, University of Chicago Press, Chicago IL., 305-348.
Zeldes, S.P. (1989): "Optimal Consumption with Stochastic Income: Deviations from Certainty Equivalence," *Quarterly Journal of Economics*, 104(2), 275-298.
Deaton, A. (1991): "Saving and Liquidity Constraints," *Econometrica*, 59(5), 1221-1248.
Carroll, C.D. (1997): "Buffer-Stock Savings and the Life-Cycle/Permanent Income Hypothesis," *Quarterly Journal of Economic*, 112, 1-56.
Hubbard, R.G., J. Skinner, S.P. Zeldes (1994): "The Importance of Precautionary Motives in Explaining Individual and Aggregate Saving," *Carnegie-Rochester Conference Series on Public Policy*, 40, 59-125.
Gourinchas, P.O., and J.A. Parker (2002): "Consumption over the Life Cycle," *Econometrica*, 70(1), 47-89.
Kaplan, G., G.L. Violante (2014): "A Model of the Consumption Response to Fiscal Stimulus Payments," *Econometrica*, 82(4), 1199-1239.
Laibson, D. (1997): "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics*, 112, 443-477.

Ganong, P., and P. Noel (2019): "Consumer Spending during Unemployment: Positive and Normative Implications," *American Economic Review*, 109(7), 2383-2424.
Aiyagari, S.R. (1994): "Uninsurable Idiosyncratic Risk and Aggregate Saving," *Quarterly Journal of Economics*, 109(3), 659-684.

7 Asset Pricing and Aggregate Risk

7.1 The Equity Premium Puzzle

*Campbell, J.Y. (1999): "Asset Prices, Consumption, and the Business Cycle," in *Handbook of Macroeconomics*, ed. J.B. Taylor and M. Woodford, Elservier, Amsterdam, Holland. [Sections 1-3]
*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 8.5]
Mehra, R. and E.C. Prescott (1985): "The Equity Premium Puzzle," *Journal of Monetary Economics*, 15, 145-161.

7.2 Estimation of the Intertemporal Elasticity of Substitution

*Campbell, J.Y., and N.G. Mankiw (1989): "Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence," *NBER Macroeconomics Annual*, 4, 185-216. [Section 2]
*Yogo, M. (2004): "Estimating the Elasticity of Intertemporal Substitution when Instruments are Weak," *Review of Economics and Statistics*, 86(3). 797-810.
*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 8.4]
*Best, M.C., J. Cloyne, E. Ilzetzki, and H. Kleven (2019): "Estimating the Elasticity of Intertemporal Substitution Using Mortgage Notches," *Review of Economic Studies*, forthcoming.
Gruber, J. (2013): "A Tax-Based Estimate of the Elasticity of Intertemporal Substitution," *Quarterly Journal of Finance*, 3(1), 1350001.
Hall, R.E. (1988): "Intertemporal Substitution in Consumption," *Journal of Political Economy*, 96(2), 339-357.
Hansen, L.P. and K.J. Singleton (1983): "Stochastic Consumption, Risk Aversion, and the Temporal Behavior of Asset Returns," *Journal of Political Economy*, 91(2), 249-265.

7.3 Welfare Costs of Fluctuations

Lucas, R.E. (2003): "Macroeconomic Priorities," *American Economic Review*, 93(1), 1-14.
Barro, R.J. (2009): "Rare Disasters, Asset Prices, and Welfare Costs," American Economic Review, 99(1), 243-264.

7.4 Trend vs. Random Walk in Output:

*Cochrane, J.H. (1988): "How Big Is the Random Walk in GNP?" *Journal of Political Economy*, 96, 893-920.
*Cogley, T. (1990): "International Evidence on the Size of the Random Walk in Output," *Journal of Political Economy*, 98, 501-518.
Perron, P. (1989): "The Great Crash, the Oil Price Shock and the Unit Root Hypothesis," *Econometrica*, 57, 1361-1401.
Nelson, C.R. and C.I. Plosser (1982): "Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications," *Journal of Monetary Economics*, 10, 139-162.
Romer, C.D. (1986): "Is the Stabilization of the Postwar Economy a Figment of the Data," *American Economic Review*, 76(3), 314-334.

7.5 Disasters and Long-Run Risks

Barro, R.J. (2006): "Rare Disasters and Asset Markets in the Twentieth Century," *Quarterly Journal of Economics*, 121(3), 832-866.
Bansal, R. and A. Yaron (2004): "Risk for the Long Run: A Potential Resolution of Asset Pricing Puzzles," *Journal of Finance*, 54(4), 1481-1509.
Rietz, T.A. (1988): "The Equity Risk Premium: A Solution," *Journal of Monetary Economics*, 22, 117-131.
Nakamura, E., J. Steinsson, R. Barro, J. Ursua (2013): "Crises and Recoveries in an Empirical Model of Consumption Disasters," *American Economic Journal: Macroeconomics*, 5(3), 35-74.
Nakamura, E., D. Sergeyev and J. Steinsson (2017): "Uncertainty Shocks and Long Run Risks: Evidence from a Long-Term Consumption Panel," *American Economic Journal: Macroeconomics*, 9(1), 1-39.

8 Investment

8.1 Basic Q Theory of Investment

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 9.1-9.5]
Obstfeld, M., and K. Rogoff (1996): *Foundations of International Macroeconomics*, MIT Press, Cambridge, MA. [Chapter 2.5.2]
Abel, A.B. (1990): "Consumption and Investment," *Handbook of Monetary Economics*, Vol II, Chapter 14, 725-778.
Hayashi, F. (1982): "Tobin's Marginal *q* and Average *q*: A Neoclassical Interpretation," *Econometrica*, 50, 213-224.
Abel, A.B. (1982): "Dynamic Effects of Permanent and Temporary Tax Policies in a *q* Model of Investment," *Journal of Monetary Economics*, 9, 353-373.

8.2 The Response of Investment to Q, Cash Flows, and Interest Rates

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 9.6 and 10.3]
*Fazzari, S.M., R.G. Hubbard, and B.C. Petersen (1988): "Financing Constraints and Corporate Investment," *Brookings Papers on Economic Activity*, 1, 141-195.
*Zwick, E., and J. Mahon (2017): "Tax Policy and Heterogeneous Investment Behavior," *American Economic Review*, 107(1), 217-248.
Yagan, D. (2015): "Capital Tax Reform and the Real Economy: The Effects of the 2003 Dividend Tax Cut," *American Economic Review*, 105(12), 3531-3563.
House, C.L., and M. Shapiro (2008): "Temporary Investment Tax Incentives: Theory with Evidence from Bonus Depreciation," *American Economic Review*, 98(3), 737-768.
Goolsbee, A. (1998): "Investment Tax Incentives, Prices, and the Supply of Capital Goods," *Quarterly Journal of Economics*, 113(1), 121-148.
Gomes, J.F. (2001): "Financing Investment," *American Economic Review*, 91, 1263-1285.

8.3 Heterogeneous Firms and Lumpy Adjustment

Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 9.8]
Koby, Y., and C. Wolf (2019): "Aggregation in Heterogeneous-Firm Models: A Sufficient Statistics Approach," Working Paper, Princeton University.
Winberry, T. (2018): "Lumpy Investment, Business Cycles, and Stimulus Policy," *American Economic Review*, forthcoming.

House, C.L. (2014): "Fixed Costs and Long-Lived Investments," *Journal of Monetary Economics*, 68, 86-100.
Khan, A., and J.K. Thomas (2008): "Idiosyncratic Shocks and the Role of Nonconvexities in Plant and Aggregate Investment Dynamics," *Econometrica*, 76(2), 395-436.
Thomas, J.K. (2002): "Is Lumpy Investment Relevant for the Business Cycle?" *Journal of Political Economy*, 110(3), 508-534.
Cooper, R., and J. Haltiwanger (2006): "On the Nature of Capital Adjustment Costs," *Review of Economic Studies*, 73, 611-634.
Caballero, R.J., E.M.R.A. Engel, and J.C. Haltiwanger (1995): "Plant-Level Adjustment and Aggregate Investment Dynamics," *Brookings Papers on Economic Activity*, 1995/2, 1-39.
Doms, M. and T. Dunne (1998): "Capital Adjustment Patterns in Manufacturing Plants," *Review of Economic Dynamics*, 1, 409-429.

9 Financial Frictions and Financial Crises

9.1 Investment and Financial Frictions

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 10.1-10.2]

9.2 Bank Runs

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 10.6]
Goldstein, I., and Pauzner, A. (2005): "Demand-Deposit Contract and the Probability of Bank Runs," *Journal of Finance*, 60, 1293-1327.
Diamond, D.W., and P.H. Dybvig (1983): "Bank Runs, Deposit Insurance, and Liquidity," *Journal of Political Economy*, 91, 401-419.

9.3 Speculative Attacks (May Skip)

*Romer, D. (2019): *Advanced Macroeconomics*, McGraw Hill, New York, NY. [Chapter 10.7]
*Lorenzoni, G. (2014): "International Financial Crises," *Handbook of International Economics, Volume 4*, Elsevier, Holland, 689-740. [Sections 1, 2 and 5]
*Morris, S., and H.S. Shin (1998): "Unique Equilibrium in a Model of Self-Fulfilling Currency Attacks," *American Economic Review*, 88, 587-597.
Lorenzoni, G., and I. Werning (2019): "Slow Moving Debt Crises," *American Economic Review*, forthcoming.
Calvo, G.A. (1988): "Servicing the Public Debt: The Role of Expectations," *American Economic Review*, 78(4), 647-661.
Obstfeld, M. (1986): "Rational and Self-Fulfilling Balance-of-Payments Crises," *American Economic Review*, 76(1), 72-81.