Econ 498

Advanced Topics in Economics

Profs. George-Marios Angeletos and Alessandro Pavan

The course focuses on the role of coordination, information, and expectations in settings of interest to both macro- and micro-economists. Topics include beauty contests, global games, information acquisition, rational inattention, and bounded rationality. After being introduced to the theoretical underpinnings, students will learn how to apply the techniques to topics such as business-cycle fluctuations, bank runs, political change, the social value of information, optimal monetary and fiscal policy, information design, and endogenous uncertainty.

Prerequisites: Micro- and macro-economics at 1st-year PhD level.

Evaluation: Problem sets, plus: either presentation and referee report, or research proposal. (Topic and further details to be discussed with instructors.)

Class Time: Monday and Wednesday, 1.30-3.30 PM

Academic Integrity

Students in this course are required to comply with the policies found in the booklet, "Academic Integrity at Northwestern University: A Basic Guide". All papers submitted for credit in this course must be submitted electronically unless otherwise instructed by the professor. Your written work may be tested for plagiarized content. For details regarding academic integrity at Northwestern or to download the guide, visit: https://www.northwestern.edu/provost/policies/academic-integrity/index.html

Accessibility

Northwestern University is committed to providing the most accessible learning environment as possible for students with disabilities. Should you anticipate or experience disability-related barriers in the academic setting, please contact AccessibleNU to move forward with the university's established accommodation process (e: accessiblenu@northwestern.edu; p: 847-467-5530). If you already have established accommodations with AccessibleNU, please let me know as soon as possible, preferably within the first two weeks of the term, so we can work together to implement your disability accommodations. Disability information, including academic accommodations, is confidential under the Family Educational Rights and Privacy Act.

COVID-19 Classroom Expectations

Students, faculty, and staff must comply with University expectations regarding appropriate classroom behavior, including those outlined below and in the COVID-19 Code of Conduct. With respect to classroom procedures, this includes:

- Policies regarding masking and social distancing evolve as the public health situation changes. Students are responsible for understanding and complying with current masking, testing, Symptom Tracking, and social distancing requirements.

- In some classes, masking and/or social distancing may be required as a result of an Americans with Disabilities Act (ADA) accommodation for the instructor or a student in the class even when not generally required on campus. In such cases, the instructor will notify the class.

- No food is allowed inside classrooms. Drinks are permitted, but please keep your face covering on and use a straw.

- Faculty may assign seats in some classes to help facilitate contact tracing in the event that a student tests positive for COVID-19. Students must sit in their assigned seats.

If a student fails to comply with the COVID-19 Code of Conduct or other University expectations related to COVID-19, the instructor may ask the student to leave the class. The instructor is asked to report the incident to the Office of Community Standards for additional follow-up.

COVID-19 Testing Compliance

To protect the health of our community, Northwestern University requires unvaccinated students who are in on-campus programs to be tested for COVID-19 twice per week.

Students who fail to comply with current or future COVID-19 testing protocols will be referred to the Office of Community standards to face disciplinary action, including escalation up to restriction from campus and suspension.

Guidance on Class Recordings

Portions of this class may be recorded by the instructor for educational purpose and available to the class during the quarter. Your instructor will communicate how you can access the recordings. Portions of the course that contain images, questions or commentary/discussion by students will be edited out of any recordings that are saved beyond the current term.

Class Recording

Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact AccessibleNU. Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. Under the University's Copyright Policy, faculty own the copyright to instructional materials – including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display, or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording, or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.

Support for Wellness and Mental Health

Northwestern University is committed to supporting the wellness of our students. Student Affairs has multiple resources to support student wellness and mental health. If you are feeling distressed or overwhelmed, please reach out for help. Students can access confidential resources through the Counseling and Psychological Services (CAPS), Religious and Spiritual Life (RSL) and the Center for Awareness, Response and Education (CARE). Additional information on all of the resources mentioned above can be found here:
https://www.northwestern.edu/counseling/
https://www.northwestern.edu/religious-life/
https://www.northwestern.edu/care/

Tentative Schedule

Date	Topic	
3/29	Beauty Contests	GMA
3/30	Beauty Contests	GMA
4/4	Global Games	AP
4/6	Global Games	AP
4/11	Applications to Business Cycles	GMA
4/13	Applications to Business Cycles	GMA
4/18	News, Confidence, Ambiguity	GMA
4/20	News, Confidence, Ambiguity	GMA
4/25	Dynamic Coordination	AP
4/27	Dynamic Coordination	AP
5/2	Information Acquisition	AP
5/4	Information Acquisition	AP
5/9	Rational Inattention, and Optimal Policy	GMA
5/11	Forward Guidance and Bounded Rationality	GMA
5/16	Forward Guidance and Bounded Rationality	GMA + Pooya Molavi
5/18	Simple Models and Biased Forecasts	Pooya Molavi + AP
5/23	Signaling, Information Design and Adversarial Coordination	AP
5/25	Signaling, Information Design and Adversarial Coordination	AP
5/30	No class	
6/1	TBD	GMA/AP

Reading List

We will cover only a subset of the references listed below. The list is meant to provide students with information about related research topics. The required readings are marked with a *.

Introduction to Beauty Contests

Allen, F., S. Morris, and H. S. Shin (2006), "Beauty Contests and Iterated Expectations" *Review of Financial Studies*, 19(3), 719-752.

* Angeletos, G.M., and A. Pavan (2007), "Efficient Use of Information and Social Value of Information," *Econometrica*, 75(5), 1103-1142.

Angeletos, G.M., L. Iovino, and J. La'O (2016), "Real Rigidity, Nominal Rigidity and the Social Value of Information," *American Economic Review*, 106(1), 200-227.

Angeletos, G.M., and C. Lian (2016), "Incomplete Information in Macroeconomics: Accommodating Frictions in Coordination," *Handbook of Macroeconomics*, Vol. 2.

Angeletos, G. M., and A. Pavan (2009), "Policy with Dispersed Information", *Journal of the European Economic Association*, 7(1), 11–60.

Cooper, R. (1999), "*Coordination Games: Complementarities and Macroeconomics*," Cambridge University Press

Bergmann, D., T. Heumann, and S. Morris (2015), "Information and Volatility," *Journal of Economic Theory*, 158(B), 427-465.

Bergmann, D., and S. Morris (2013), "Robust Predictions in Games of Incomplete Information," *Econometrica*, 81(4), 1251–1308.

Huo, Z. and M. Pedroni Zouain (2020), "A Single-Judge Solution to Beauty Contests," *American Economic Review*, 110(2), 526-568.

* Morris, S., and H.S. Shin (2002), "The Social Value of Public Information," *American Economic Review* 92(5), 1521-1534.

Introduction to Global Games

Atkeson, A. (2000), "Discussion of Stephen Morris and Hyun Song Shin's "Rethinking Multiple Equilibria in Macroeconomic Modelling"," *NBER Macroeconomics Annual (2000)*.

Baliga, S., and S. Morris (2002), "Coordination, Spillovers and Cheap-Talk," *Journal of Economic Theory*, 105(2), 450-468.

Binmore, K., and L. Samuelson (2001), "Coordinated Action in the Electronic Mail Game," *Games and Economic Behavior*, 35(1-2), 6-30.

Carlsson H., and E. van Damme (1993), "Global Games and Equilibrium Selection," *Econometrica*, 61(5), 989-1018.

Chamley, C. (1999), "Coordinating Regime Switches," *The Quarterly Journal of Economics*, 114(3), 869-905.

Corsetti, G., A. Dasgupta, S. Morris, and H. S. Shin (2003), "Does One Soros Make a Difference? A Theory of Currency Crises with Large and Small Traders," *The Review of Economic Studies*, 71(1), 87-113.

Frankel, D., S. Morris, and A. Pauzner (2003), "Equilibrium Selection in Global Games with Strategic Complementarities," *Journal of Economic Theory,* 108(1), 1-44.

Harrison, R., and P. Jara-Moroni (2006), "Equilibrium selection in global games with strategic substitutes," *mimeo,* Georgetown University.

Kim, Y. (1996), "Equilibrium Selection in N-Person Coordination Games," *Games and Economic Behavior*, 15(2), 203-227.

Milgrom P., and J. Roberts (1990), "Rationalizability, Learning, and Equilibrium in Games with Strategic Complementarities," *Econometrica*, 58(6), 1255-1277.

Monderer D., and D. Samet (1989), "Approximating Common Knowledge with Common Beliefs," *Games and Economic Behavior*, 1(2), 170-190.

Monderer D., and D. Samet (1996), "Proximity of information in games with incomplete information," *Mathematics of Operations Research*, 21(3), 707-725.

Monderer D., and L. Shapley (1996), "Potential Games," *Games and Economic Behavior*, 14(1), 124-143.

Morris, St., and H.S. Shin (2004). "Coordination risk and the price of debt." *European Economic Review* 48 (1), 133-153.

Morris, S., and H. S. Shin (2004). "Liquidity black holes." *Review of Finance* 8.1, 1-18.

Morris S. (2001), "Faulty Communication: Some Variations on the Electronic Mail Game," *Advances in Theoretical Economics*, 1(1), 1027.

Morris S. (2002), "Coordination, Communication and Common Knowledge: A Retrospective on the Electronic-mail Game," *Oxford Review of Economic Policy*, 18(4), 433-44.

Morris S., and H. S. Shin (1998), "Unique Equilibrium in a Model of Self-Fulfilling Currency Attacks," *American Economic Review*, 88(3), 587-97.

Morris S., and H. S. Shin (2000), "Rethinking Multiple Equilibria in Macroeconomic Modeling," *NBER Macroeconomic Annual*, 15, 139-161.

* Morris, S., and H. S. Shin (2003), "Global Games - Theory and Applications," *Advances in Economics and Econometrics (8th World Congress of the Econometric Society)*, Cambridge University Press.

* Morris, S., H. S. Shin, and M. Yildiz (2016), "Common Belief Foundations of Global Games," *Journal of Economic Theory*, 163, 826-848.

Rubinstein A. (1989), "The Electronic Mail Game: Strategic Behavior under Almost Common Knowledge," *American Economic Review*, 79(3), 385-391.

Steiner J., and J. Sakovics (2012), "Who Matters in Coordination Problems," *American Economic Review*, 102(7), 3439-3461.

Weinstein, J., and M. Yildiz (2007), "A Structure Theorem for Rationalizability with Applications to Robust Predictions of Refinements," *Econometrica*, 75(2), 365-400.

Applications to Business Cycles

* Angeletos, G.M., and J. La'O (2010). "Noisy Business Cycles." *NBER Macroeconomics Annual* 24.1, 319-378.

Angeletos, G.M., and J. La'O (2012), "Incomplete Information, Higher-Order Beliefs, and Price Inertia," *Journal of Monetary Economics* 56(S), 19-37.

Angeletos, G.M., and J. La'O (2013), "Sentiments," *Econometrica 81(2) 319-378*.

* Angeletos, G.M., F. Collard, and H. Dellas (2018), "Quantifying Confidence," *Econometrica 86(5), 1689-1726*.

* Angeletos, G.M., F. Collard, and H. Dellas (2021), "Business Cycle Anatomy," *American Economic Review 110(10), 3030-3070*.

* Chahrour, R., Nimark, K. P., & Pitschner, S. (2021), "Sectoral media focus and aggregate fluctuations," *American Economic Review 111(12), 3872-3922*.

Chahrour, R., and G. Gaballo (2021), "Learning from House Prices: Amplification and Business Fluctuations," *Review of Economic Studies 88(4), 1720-1759*.

* Flynn, J., and K. Sastry (2021), "Attention Cycles," MIT *mimeo*.

Nimark, K. (2008), "Dynamic Pricing and Imperfect Common Knowledge," *Journal of Monetary Economics* 55(2), 365-382.

* Lorenzoni, G. (2009), "A Theory of Demand Shocks," *American Economic Review 99(5), 2050-2084*.

Lucas, R. E., Jr. (1972), "Expectations and the Neutrality of Money," *Journal of Economic Theory* 4, 103-124.

Milani, F. (2011), "Expectation Shocks and Learning as Drivers of the Business Cycle," *Economic Journal* 121, 379-401.

* Mankiw, N. G., and R. Reis (2002), "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve," *Quarterly Journal of Economics* 117, 1295-1328.

Morris, Stephen, and Hyun Song Shin (2018), "Central Bank Forward Guidance and the Signal Value of Market Prices," *BIS Working Papers*, No 692.

* Schaal, E., and Ma. Taschereau-Dumouche (2018), "Coordinating Business Cycles," CREI/UPF/Cornell University mimeo.

Townsend, R. (1983), "Forecasting the Forecasts of Others," *Journal of Political Economy* 91, 546-588.

* Woodford, M. (2003a), "Imperfect Common Knowledge and the Effects of Monetary Policy," in P. Aghion, R. Frydman, J. Stiglitz, and M. Woodford, eds., Knowledge, Information, and Expectations in Modern Macroeconomics: In Honor of Edmund S. Phelps, Princeton University Press.

Survey and Other Evidence

* Angeletos,G.M., Z. Huo and K. Sastry (2020), "Imperfect Macroeconomic Expectations: Evidence and Theory," *NBER Macroeconomics Annual*.

Bhandari, A., Borovička, J., & Ho, P. (2019). "Survey data and subjective beliefs in business cycle models", mimeo.

* Bordalo, Pedro, Nicola Gennaioli, Yueran Ma, and Andrei Shleifer (2020), "Overreaction in Macroeconomic Expectations," *American Economic Review* 110(9), 2748-2782.

Bouchaud, J. P., Krueger, P., Landier, A., and Thesmar, D. (2016), "Sticky Expectations and Stock Market Anomalies," mimeo.

Caroll, C., (2001): "Macroeconomic Expectations of Households and Professional Forecasters," *Quarterly Journal of Economics*, 118, 169–298.

Coibion, O., and Y. Gorodnichenko (2012), "What can survey forecasts tell us about informational rigidities?" *Journal of Political Economy* 120(1), 116-159.

* Coibion, O., and Y. Gorodnichenko (2015), "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts," *American Economic Review* 105(8), 2644-2678.

* Coibion, O., Y. Gorodnichenko, S. Kumar, and J. Ryngaert (2021), "Do You Know That I Know That You Know...? Higher-Order Beliefs in Survey Data," *Quarterly Journal of Economics* 136(3), 1387-1446.

Coibion, O., Y. Gorodnichenko, and S. Kumar (2015). "How Do Firms Form Their Expectations? New Survey Evidence." *NBER Working Paper*

Coibion, O., Y. Gorodnichenko, and T. Ropele (2020). "Inflation Expectations and Firm Decisions: New Causal Evidence." *Quarterly Journal of Economics 135(1), 165-219*.

* Coibion, O., Y. Gorodnichenko, S. Kumar., and M. Pedemonte (2019). "Inflation Expectations as a Policy Tool?," Mimeo.

* D'Acunto, F., Malmendier, U., Ospina, J., & Weber, M. (2021). "Exposure to grocery prices and inflation expectations", *Journal of Political Economy*, 129(5), 1615-1639.

Frankel, J. and K. Froot. 1987. "Using Survey Data to Test Standard Propositions Regarding Exchange Rate Expectations." *American Economic Review* 77 (1):133–53.

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* Gennaioli, N., Y. Ma, and A. Shleifer (2015), "Expectations and Investment," in *NBER Macroeconomics Annual*, Volume 30, University of Chicago Press.

Greenwood, R., and A. Shleifer (2014), "Expectations of Returns and Expected Returns." *Review of Financial Studies*, 27(3), 714-746.

Gap, Z., M. Sockinz, and W. Xiong (2020), "Learning about the Neighborhood," mimeo.

Kohlhas, A. and T. Broer (2019), "Forecaster (Mis-)Behavior." IIES mimeo.

Mankiw, N.G., R. Reis, and J. Wolfers (2003), "Disagreement about Inflation Expectations," *NBER Macroeconomics Annual*.

*Malmendier, U., & Nagel, S. (2016). "Learning from inflation experiences", *Quarterly Journal of Economics*, 131(1), 53-87.

Nagel, R. (1995). "Unraveling in Guessing Games: An Experimental Study." *American Economic Review* 85 (5):1313–1326.

Stahl, D.O., and P.W. Wilson. (1994). "Experimental Evidence on Players' Models of Other Players," *Journal of Economic Behavior & Organization* 25 (3), 309-327.

Dynamic Coordination

Basak, D., Zhou, Z., (2019), "Diffusing coordination risk," *American Economic Review 110(1), 271-297*.

* Abreu D., and M. Brunnermeier (2003), "Bubbles and Crashes," *Econometrica*, 71(1), 173-204.

* Angeletos G. M., C. Hellwig, and A. Pavan (2007), "Dynamic Global Games of Regime Change: Multiplicity, Learning and Timing of Attacks," *Econometrica,* 75(3), 711-756.

Burdzy, K. D. Frankel and A. Pauzner (2001), "Fast Equilibrium Selection by Rational Players Living in a Changing World," *Econometrica*, 69(1), 163-189.

Chassang, S. (2010) "Fear of Miscoordination and the Robustness of Cooperation in Dynamic Global Games with Exit," *Econometrica*, 78(3), 973-1006.

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* Frankel, D., and A. Pauzner (2000), "Resolving Indeterminacy in Dynamic Settings: The Role of Shocks," *Quarterly Journal of Economics* 115(1), 283-304.

Giannitsarou, C., and F. Toxvaerd (2007), "Recursive Global Games," *mimeo*, Cambridge University.

Guimaraes, B. (2006), "Dynamics of Currency Crises with Asset Market Frictions," *Journal of International Economics*, 68(1), 141-158.

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

Heidhues, P., and N. Melissas (2006), "Equilibria in a Dynamic Global Game: The Role of Cohort Effects," *Economic Theory*, 28(3), 531-557.

Levin, J. (2001), "A Note on Global Games with Overlapping Generations," (2001), *mimeo*, Stanford University.

Mathevet, L., and J. Steiner (2013), "Tractable Dynamic Global Games and Applications," *Journal of Economic Theory*, 148(6), 2583-2619.

Matsui, A., and K. Matsuyama (1995), "An Approach to Equilibrium Selection," *Journal of Economic Theory*, 65(2), 415-464.

Morris, S., and H. S. Shin (1999), "A Theory of the Onset of Currency Attacks," *Asian Financial Crisis: Causes, Contagion and Consequences*, 2, 230.

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Morris, S., and M. Yildiz (2019), "Crises: Equilibrium Shifts and Large Shocks", *American Economic Review* 109(8), 2823-2854.

Xue, J. (2003), "Endogenous Timing and Efficiency in Coordination Games with Incomplete Information," *mimeo*, Penn State University.

Information Acquisition and Rational Inattention

* Angeletos, G.M. and K. Sastry (2021), "Inattentive Economies," mimeo, MIT.

* Angeletos, G.M., and J. La'O (2020), "Optimal Monetary Policy with Informational Frictions," *Journal of Political Economy* 128(3), 1027-1064.

* Colombo, L., G. Femminis, and A. Pavan (2014), "Information Acquisition and Welfare," *The Review of Economic Studies*, 81(4), 1438-1483.

Colombo, L., G. Femminis, and A. Pavan, (2022), "Subsidies for Technology Adoption with Endogenous Uncertainty," *mimeo* Northwestern University.

Denti, T. (2022), "Unrestricted Information Acquisition," Cornell University mimeo.

* Hebert, B. and J. La'O (2020), "Information Acquisition, Efficiency, and Non-Fundamental Volatility," mimeo Columbia/Stanford University.

Hellwig, C., and L. Veldkamp (2009), "Knowing What Others Know: Coordination Motives in Information Acquisition," *Review of Economic Studies*, 76(1), 223-251.

Hirshleifer, J. (1971), "The Private and Social Value of Information and the Reward to Inventive Activity," *American Economic Review* 61(4), 561-574.

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* Mackowiak, B., and M. Wiederholt (2009), "Optimal Sticky Prices under Rational Inattention," *American Economic Review* 99(3), 769-803.

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* Morris, S. and M. Yang (2019), "Coordination and Continuous Stochastic Choice," *Review of Economic Studies*, forthcoming

Myatt, D. P., and C. Wallace (2012), "Endogenous Information Acquisition in Coordination Games," *The Review of Economic Studies*, 79(1), 340-374.

Pavan, A. (2017), "Attention, Coordination, and Bounded Recall," *mimeo*, Northwestern University.

Pavan, A., Sundaresan S. and X. Vives "(In)efficiency in Information Acquisition and Aggregation through Prices," *mimeo*, Northwestern University.

Szkup, M., Trevino, I., (2015), "Information acquisition in global games of regime change," *Journal of Economic Theory* 160, 387–428.

Reis, R. (2006), "Inattentive Producers," *Review of Economic Studies* 73, 793-821.

Sims, C. (2003), "Implications of Rational Inattention," *Journal of Monetary Economics* 50, 665-690.

Sims, C. (2015), "Rational Inattention and Monetary Economics," *Handbook of Monetary Economics*.

Veldkamp, L. (2006), "Media Frenzies in Markets for Financial Information," *American Economic Review* 96(3), 577-601.

* Yang, M. (2015) "Coordination with Flexible Information Acquisition," *Journal of Economic Theory*, 158, 721-738.

Information Revelation, Information Design, Adversarial Coordination (with policy applications)

* Angeletos G. M., C. Hellwig, and A. Pavan (2006), "Signaling in a Global Game: Coordination and Policy Traps," *Journal of Political Economy*, 114(3), 452-484.

Angeletos G. M., and A. Pavan (2013), "Selection-free Predictions in Global Game with Endogenous Information and Multiple Equilibria," *Theoretical Economics*, 8(3), 883-938.

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* Basak, D., Zhou, Z., (2021), "Panicks and Early Warnings," WP, Indiana University and Tsinghua University.

Edmond, C. (2013), "Information Manipulation, Coordination, and Regime Change," *The Review of Economic Studies*, 80(4), 1422-1458.

* Li, F., Yangbo, S., Zhao, M., (2020), "Global manipulation by local obfuscation," WP, UNC

Hellwig, C., A. Mukerji, and A. Tsyvinski (2006), "Self-fulfilling Currency Crises: the Role of Interest Rates," American Economic Review 96(5), 1769-1787.

* Inostroza, N., and A. Pavan (2021), "Persuasion in Global Games with Application to Stress Testing," *mimeo*, Northwestern University.

Inostroza, N. (2021), "Persuading multiple audiences: An information design approach to banking Regulation," WP. University of Toronto.

Morris S., and H. S. Shin (2006), "Endogenous Public Signals and Coordination," *mimeo*, Princeton University.

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* Morris, S., Daisuke, O., Takahashi, S., (2020), "Information design in binary-action supermodular games," WP, MIT .

Forward Guidance, Bounded Rationality

Allen, F., S. Morris, and A. Postlewaite. (1993), "Finite Bubbles with Short Sale Constraints and Asymmetric Information," *Journal of Economic Theory*, 61(2), 206-229.

* Angeletos, G.M., and C. Lian (2018), "Forward Guidance without Common Knowledge," *American Economic Review 108(9*), 2577-2512.

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* Angeletos, G.M., and C. Lian (2021), "Dampening General Equilibrium: Incomplete Information and Bounded Rationality," *Handbook of Macroeconomic Expectations*, forthcoming.

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* Crawford, V.P, M.A. Costa-Gomes, and N. Iriberri. (2013). "Structural Models of Nonequilibrium Strategic Thinking: Theory, Evidence, and Applications." *Journal of Economic Literature* 51 (1):5–62.

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* McKay, A., E. Nakamura, and J. Steinsson. (2016b) "The Power of Forward Guidance Revisited." *American Economic Review*, 106(10): 3133–3158.

Eusepi, S., and B. Preston (2011): "Expectations, Learning and Business Cycle Fluctuations," *American Economic Review*, 101(6), 2844–2872.

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* Farhi, E., and I. Werning (2019). "Monetary policy, bounded rationality, and incomplete markets." *American Economic Review* 109(11), 3887-3928.

Gabaix, X. (2014). "A Sparsity-based Model of Bounded Rationality." *Quarterly Journal of Economics* 129 (4), 1661-1710.

* Gabaix, X. (2019). "A Behavioral New Keynesian Model." Harvard Mimeo

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Greenwood, R., and S. G. Hanson (2014). "Waves in ship prices and investment." *Quarterly Journal of Economics* 130 (1), 55-109.

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* Molavi, P. (2019), "Simple Models and Biased Forecasts," Northwestern University mimeo.

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Stahl, D. O and P. W. Wilson. (1994). "Experimental Evidence on Players' Models of Other Players." *Journal of Economic Behavior & Organization* 25(3), 309-327.

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* Vimercati, Riccardo Bianchi, Martin S Eichenbaum, and Joao Guerreiro. (2021). "Fiscal Policy at the Zero Lower Bound without Rational Expectations." *NBER Working Paper* 29134 .