

Economics 1036
Fall 2018

Matthew Rabin
HBS and Economics Department
Harvard University

The Psychology and Economics of Beliefs:

Wednesdays 9:45am-11:45pm, M17 Littauer Center

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Registration is by consent of the instructor. (There is no lottery!) Students interested in taking the course should email Professor Rabin at matthewrabin@fas.harvard.edu **after reading the syllabus thoroughly** to indicate your relevant background, and ask questions. You should include if possible a resume including the prerequisite courses indicated below that you have taken, and ideally an (unofficial) transcript of your courses and grades at Harvard.

WHAT IS THIS COURSE?

This seminar focuses on how individuals and groups come to form beliefs about important things in their lives. What careers are lucrative and rewarding? What medicines are effective? What lifestyles are healthy? What investment strategies make sense? What is your nation's income and wealth distribution? What would a 10% decrease in taxes do to the unemployment rate? What will be the average global temperature in 2030, and how would that depend on the number of countries that adhere to the Kyoto Accords? How many days do you predict you will go on vacation next year? How many children will you have by 2030? What are the average grades likely to be in this course—and what will your grade be? What percentage of soldiers died in various previous wars and flu epidemics? What is the probability of a pandemic disease that doubles the death rate in the U.S. in 2019 compared to 2017? How many times do you expect to check your email tomorrow? How many times do you believe you did it yesterday? Etc. And, centrally, how do all these beliefs compare to correct beliefs—those that are empirically valid, or at least that would be fully rational given the information you have?

We will review theories and evidence about how individuals develop their beliefs from personal observations and experience, and how people learn from each other. We will also study difficulties in defining beliefs and in measuring beliefs, and the existence (or not) of data in different domains for what people actually believe. The organizing theme will be to compare the assumption of full rationality that is traditional in economic theory to evidence identified by psychologists about the types of errors people make. We will also explore what consequences these errors have for important economic, medical, social, and political choices. In each of these domains, when do people become overconfident in their beliefs? Or instead not learn as much as they should? Are people's beliefs internally consistent? When do groups of people all come to the same conclusions, vs. “polarize” into very different beliefs.

The course will be intentionally eclectic in terms of the nature of the material, and in assignments that will count towards your grade. Lectures will present some of the psychological evidence on how people do form beliefs, and an emphasis on some of the ways we formally model errors in belief formation. (In all cases, learning how we model the errors will necessarily involve learning the correct statistical analysis that fully rational agents would apply.) Assignments will include mathematical problem sets requiring you to solve for both what the rational conclusions are for processing information and what conclusions our models of errors predict people will reach. The course will also involve reading and research on people's particular beliefs in different domains, and some oral and written analysis of such research. You will also be asked to formulate (but not necessarily execute) a design for an incentivized survey to collect and interpret people's beliefs in some domain. Most oddly, some of the course will involve you—to the degree you are comfortable and consistent with desire for privacy—analyzing and understanding how you go about reaching beliefs relevant to your own economic, medical, and social choices.

Required readings will include academic research in psychology, economic theory, empirical economics, and historical and sociological research describing the prevalence and changes in beliefs over time. Given the nature of the course, full attendance (insofar as it is consistent with your health and the health of those around you) is required.

CAN YOU TAKE THE COURSE, AND IS IT FOR YOU?

The course is available solely to undergraduates at Harvard. It is not open to registration for masters or PhD students. Because it is a seminar course that emphasizes comfortable participation and discussion in a small group (and in a small room!) sharing the appropriate background, it is not open for auditors.

Because of the heavy emphasis on rigorous formal theories and measurements along the lines of mainstream economics, the seminar requires background in microeconomics, mathematics, and statistics/econometrics. Students should be prepared in these subjects at roughly the exposure to material expected of an economics or applied math major in the middle of junior year. Although exceptionally qualified students at earlier stages or with different backgrounds are encouraged to consider the course, it is simply not suitable for somebody who has not been exposed to

economics and math at roughly this level. (An understanding of Bayes Law and basic probabilities and statistics is a must, as is some exposure to mathematical microeconomics.) Completion of courses at the level of Math 21A and Stats 110 are strongly advised, and Math 1A, Economics 1010A or 1011A, and Stats 104 or their equivalents are required.

The perspective of the seminar is influenced by the background of both the professor and teaching fellow in economic theory, empirical economics, as well as psychology and (what is popularly known as) behavioral economics. Professor Rabin has been doing research related to the topics of this seminar for quite a long time. But much of this is new territory for us—and even new territory for the economic-research community at large. The primary goal of the seminar is to draw out connections between some of the more recent economic theory that attempts to incorporate more realistic psychology, and actual beliefs in the world. As such, we'll be exploring how to take these new theories and the psychological evidence that motivates them “to the field,” to figure out if and when and how these theories matter, and we'll cover relatively new methods in identifying people's beliefs.

REQUIREMENTS AND GRADING

All specifics below are subject to change, but requirements will include (see below for more information):

- Near full attendance
- Mathematical problem sets
- Participation in group discussions
- A semester project that involves designing (and possibly implementing) your own belief-measurement study
- Written assignments summarizing existing or original research about beliefs
- Analysis of your own belief-formation in some domain
- Office meetings with Professor Rabin
- There will **not** be an exam in the course, either in class or during the finals period.

Attendance

Due to the nature of the course, full attendance is required. You will of course be excused for unexpected emergencies or illnesses. Requests to be excused for other reasons (e.g., participation in sports or extracurricular activity) must be discussed ahead of time with Professor Rabin, at the beginning of the semester or immediately when you learn about them.

Problem Sets

There will be two problem sets. Problems will range in difficulty from moderately easy to quite hard. These problems aren't meant to be simple, and don't panic if you struggle with them. But the problem sets will be graded for correctness, so please do seek help answering any problems you are struggling with before handing them in.

You are invited (and even encouraged) to work together on the problem sets, but you are not allowed to read others' answers from past or present problem sets, and should hand in solutions separately that reflect your own understanding. You should acknowledge collaborators and describe the extent of collaboration at the top of the relevant assignments. While collaboration is allowed, directly copying someone else's work is not, and will be considered a violation of the university's code of ethics.

Problem sets will be due by the start of class at 9.45 am, whether or not you are punctual, on the due date. Please email William your problem set as a pdf or hand him a hard copy by this time. Late problem sets will not be accepted.

There are limits to the amount of time we can spend grading the problem sets. Answers requiring too much ocular, linguistic, or (avoidable) cognitive effort won't be read. Please make an effort to write/type legibly and present your results clearly and succinctly. Problems will frequently require substantial math; you are welcome to hand in all the work you did to reach an answer, but please make sure to provide guidance through your steps of reasoning, or to flag work that is superfluous to the reader. Cross out anything not meant to be part of your answer. Clearly indicate your answer by labeling (if typed) or circling (if handwritten).

Group Discussions

Tentative topics for the group discussions are in the schedule below. Participants are expected to come prepared for the group discussions, based on additional reading and other assignments, per specific instructions that will be provided.

Semester Project

Throughout the semester, each student will work towards designing (and possibly implementing) their own study that measures beliefs. To this end, we are planning on having a few assignments to help guide students to the end product:

- Written Assignment #1 (see below) will have students read academic papers that properly measure beliefs or directly discuss the methodology of measuring beliefs. This assignment will also have students propose specific examples of things for which beliefs can be measured.
- Students are encouraged to talk to William or Professor Rabin about topics and proposals for measuring specific beliefs, preferably well in advance of the October 31 deadline for getting approval of the topic by Professor Rabin.
- Each student will give a mini-presentation that discusses their project on either November 14 or November 28.

The final product will be a carefully written proposal for an experiment that is turned in before the last class. A list of potential topics and more specific instructions will be provided after class size and interests are better understood.

Written Assignments

There will be three written assignments. Two of these will be assigned approximately two weeks prior to a prepared group roundtable on a given topic (tentative topics are listed in the schedule below). For these roundtables, we will assign three to five academic papers covering the given topic for everyone to read. Students are expected to thoroughly read the papers and come to the roundtable prepared to discuss these papers (and other relevant ideas/literature). These written assignments will help guide students when preparing for these roundtables. More specific instructions will be provided when each assignment is distributed.

Planned (but Possibly Altered) Schedule of Assignments

Problem Set Itchy: Distributed September 12, due October 3 by 9.45 am.

Problem Set Scratchy: Distributed October 17, due November 7 by 9.45 am.

Written Assignment #1: Distributed September 12, due September 26 by 9.45 am

Written Assignment #2: Distributed September 26, due November 14 by 9.45 am

Written Assignment #3: Distributed October 17, due October 31 by 9.45 am

Semester Project: Distributed September 26, due December 5 by 9.45 am

Course Grade

Your course grade will be determined by (again, subject to change):

Problem sets, in total: 50%

Class participation: 20%

Written assignments: 20%

Semester Project: 20%

Note that the above percentages sum to 110%. At the end of the semester, we will reduce the contribution of your worst category by 10 percentage points. For example, assume you scored lower on the written assignments than the other three types of assignments. In this case, written assignments would only count towards 10% of your final grade.

HANDOUTS, LECTURE NOTES, AND OFFICE HOURS

We intend to post both lecture notes and handouts (including problem sets) on <https://canvas.harvard.edu/courses/43742>.

Professor Rabin's Office Hours

Professor Rabin will not hold drop-in office hours during the semester, but will have abundant office hours at two locations. He has sign-up for half-hour slots throughout the semester available to you (as well as his advisees). Please see "Office Hours" on his home page for instructions (which you should follow!). All students **must** sign up at least once to meet with Professor Rabin by the end of Week 7 (i.e., before Spring Break) and **must sign up at least twice** by the end of the semester. (These are minimums—students can sign up for more than that.) Students can choose the topics for these meetings per their interests on any assignment or topic related to the course.

We will also announce group "coffees". **Attending one of these group "coffees" can count as your second mandatory meeting with Professor Rabin.**

William's Office Hours

Subject to announced changes, William plans to have open office hours at the following times:

September 10, Monday, Basement Littauer, 9.00 to 10.30am
September 18, Tuesday, Basement Littauer, 3.00 to 4.30pm
September 27, Thursday, Basement Littauer, 10.00 to 11.30am
September 28, Friday, Basement Littauer, 2.00 to 4.00pm
October 1, Monday, Basement Littauer, 4.00 to 5.30pm
October 12, Friday, Basement Littauer, 9.00 to 10.30am
October 18, Thursday, Basement Littauer, 11.00am to 12.30pm
October 23, Tuesday, Basement Littauer, 5.00 to 6.30pm
October 29, Monday, Basement Littauer, 2.00 to 3.30pm
November 1, Thursday, Basement Littauer, 3.00 to 5.00pm
November 6, Tuesday, Basement Littauer, 11.00am to 12.00pm
November 16, Friday, Basement Littauer, 10.30am to 12.00pm
November 26, Monday, Basement Littauer, 3.00 to 4.30pm
November 29, Thursday, Basement Littauer, 9.00 to 10.30am
December 3, Monday, Basement Littauer, 10.30am to 12.00pm

All of William's office hours will be held in the basement of Littauer Center in one of the group study rooms. If for some reason one of these rooms are not available, William will send an email notifying everyone of a new location.

Please pay attention to specific dates and times of William's office hours. The rather irregular-seeming schedule is purposely designed so that no student's regular schedule precludes all the

office hours, to be compatible with his other obligations, and to be a good match with the schedule of the course. For your part, please pay advanced attention to this schedule, and plan work so that you can get any desired help from him on assignments.

If the above office hours are always infeasible for you, let William know, and then William will attempt to make an appointment with you. But we ask that you schedule your studying so that you are prepared to ask questions during office hours, and do not attempt to schedule extra sessions merely because of poor timing in preparation. Similarly, please attempt to avoid asking questions related to the assignments over email.

TENTATIVE SCHEDULE

We meet on Wednesdays between September 5 and December 5 (we're not meeting November 21). The planned schedule is as follows—but there will very likely be some modifications to this.

Meeting 1: September 5

- Lecture 1: Introduction to Seminar, extended motivating examples
- Introduction to Statistical Biases

Meeting 2: September 12

- Lecture: Statistical Biases continued—Evidence and Models
- Problem Set Itchy (statistical reasoning) handed out
- Written Assignment #1 handed out: Students will be asked to write questions and comments related to the readings assigned for the September 26 roundtable. Also, students will be asked to propose specific examples of things for which beliefs can be measured.

Meeting 3: September 19

- Lecture: Statistical Biases continued—Evidence and Models

Meeting 4: September 26

- Written Assignment #1 Due by 9.45am at Littauer Center M17
- Group Discussion: “Show and Tell” discussion of erroneous beliefs (about objective reality) that you, or your parents/other influential elders, or your friends/community, have had that you’ve now come to believe are wrong. (Please do not make it *too* personal!) (Even if you don’t speak, as an exercise think to yourself something you’ve really changed your mind about)
- Prepared Group Roundtable: Measuring Beliefs, Part 1

- We will read three to five papers on methods used to measure beliefs and discuss these papers and other relevant ideas (including ideas for projects)
- Assignment of Semester Project: Designing a Belief-Measurement Study
- Written Assignment #2 handed out: Record your evolving probabilistic beliefs about something in your life during the month of October

Meeting 5: October 3

- Problem Set Itchy due by 9.45am at Littauer Center M17
- Lecture: Economic Implications of Biases
- Group Discussion: Popular medical/nutritional beliefs from 10,000 BC to today

Meeting 6: October 10

- Lecture: The limits to (coherent) probabilistic beliefs
- Group Discussion: Discuss examples students have found where it seems that people are exhibiting one of the statistical errors discussed so far in the course

Meeting 7: October 17

- Lecture: Social Inference and Non-Inference, Part 1
- Problem Set Scratchy (limits to probabilistic thinking and social inference) handed out
- Written Assignment #3 handed out: Students will be asked to write questions and comments related to the readings assigned for the October 31 roundtable.

Meeting 8: October 24

- Lecture: Social Inference and Non-Inference, Part 2
- Group Discussion: Examples of important errors people make by either (a) learning too little from others, or (b) inferring too much from others.

Meeting 9: October 31

- Written Assignment #3 due by 9.45am at Littauer Center M17
- Topics for the semester project must be approved by Professor Rabin by this date.
- Prepared Group Roundtable: Beliefs and Education.
 - We will read three to five papers on beliefs and education and discuss these papers and other relevant ideas.
 - Professor Basit Zafar (the author of many of the assigned papers) will be in attendance. Students should prepare specific questions to ask Professor Zafar about his papers.

Meeting 10: November 7

- Problem Set Itchy due by 9.45am at Littauer Center M17
- Lecture: Beliefs about self—mispredictions of own future preferences and actions, motivated distortion of beliefs

Meeting 11: November 14

- Written Assignment #2 due by 9.45am at Littauer Center M17
- Individual Presentations #1

Non-Meeting: No Class on November 21

Meeting 13: November 28

- Individual Presentations #2

Meeting 14: December 5

- Semester Project due by 9.45am at Littauer Center M17
- Lecture: TBD
 - This spot is reserved for material that might spillover from the lectures above, and to spend time diving deeper into some topics that interest students the most
- Group Discussion: (Recognizing this is sort of a dangerous exercise that must be handled with care) Prepare to discuss what you think is among the biggest/most costly errors that individuals make where it is clear what the rational answer is. Even if on what is a (rightly or wrongly) controversial topic, make the argument that beliefs aren't just in your mind disastrously wrong, but that they are an error—rational thinking would lead people to the right answer. As with everything in the course, it must be on an objective question not a value judgment, even if it is your value judgment that leads you to believe the objectively bad answer is so costly.

SOME RELEVANT LITERATURE

Below is a partial list of some of the relevant literature, from which required and suggested readings will be selected. The list will be expanded throughout the semester, and updates will be posted on the canvas site. Required reading will be announced in class and on assignments.

General Interest, and Methodological Approach:

1. Rabin, Matthew, Syllabus.
2. Kahneman, Daniel, Paul Slovic, and Amos Tversky, eds. (1982): *Judgment under Uncertainty: Heuristics and Biases*, Cambridge University Press. Arguably the seminal book on behavioral economics.
3. Kahneman, Daniel and Amos Tversky, eds. (2000): *Choices, Values and Frames*, New York: Russell Sage Foundation: Cambridge University Press.
4. Nisbett R. and S. Ross. (1999) *The Person and Situation*, McGraw Hill.

5. Thaler, Richard H. (1994): *The Winner's Curse: Paradoxes and Anomalies of Economic Life*, Princeton University Press. Collection of Thaler's *Anomalies* columns from *Journal of Economic Perspectives*.
6. Baron, Jonathan. (1994): *Thinking and Deciding*, Cambridge, UK; New York: Cambridge University Press.
7. Nisbett, R. and S. Ross. (1980): *Human inference: strategies and shortcomings of social judgment*, Prentice-Hall.
8. Cialdini, R. (1993): *Influence, the psychology of persuasion*, Quill. A classic in psychology.
9. Gilbert, D., S. Fiske, and G. Lindzey, editors. (1998): *Handbook of Social Psychology*, 4th ed., McGraw Hill.
10. Thaler, Richard. (1991): *Quasi-Rational Economics*: Russell Sage Foundation.
11. Kahneman, T. Gilovich, & D. Griffin, eds. (2002): *Intuitive Judgment: Heuristics and Biases*, Cambridge: Cambridge University Press.
12. Thaler, Richard, eds. (1993): *Advances in Behavioral Finance*, New York: Russell Sage Foundation.
13. Kagel, John. and Alvin Roth, eds. (1995): *Handbook of Experimental Economics*, Princeton, N.J.: Princeton University Press.
14. Camerer, Colin. (2003): *Behavioral Game Theory: Experiments in Strategic Interaction*, Russell Sage Foundation and Princeton University Press.
15. Kahneman, D., Diener, E., and Schwarz, N. (1999): *Well-Being: The Foundations of Hedonic Psychology*, Russell Sage Foundation.
16. Camerer, Colin, Loewenstein, George, and Rabin, Matthew, eds. (2003): *Advances in Behavioral Economics*, Russell Sage Foundation and Princeton University Press.
17. Thaler, Richard, "Towards A Positive Theory of Consumer Choice," CVP Chapter 15.
18. Rabin, Matthew. (1998): "Psychology and Economics." *Journal of Economic Literature* 36 (1): 11-46.
19. Rabin, Matthew. (2000): "A Perspective on Psychology and Economics," *European Economic Review*, 46(4-5): 657-685.
20. Rabin, Matthew. (2013): "An Approach to Incorporating Psychology into Economics." *American Economic Review Papers and Proceedings*, 103(3): 617-622.
21. Rabin, Matthew. (2013): "Incorporating Limited Rationality into Economics," *Journal of Economic Literature*, 51(2): 528-543
22. Gabaix, Xavier, and David Laibson. (2008): "The Seven Properties of Good Models." In eds Andrew Caplin and Andrew Schotter *The Methodologies of Modern Economics: Foundations of Positive and Normative Economics*, Oxford University Press.
23. Kahneman, D. (2011): *Thinking, Fast and Slow*, New York: Farrar, Straus, and Giroux.
24. DellaVigna, Stefano. (2009): "Psychology and Economics: Evidence from the Field." *Journal of Economic Literature*, 47 (2): 315-372.
25. Chetty, Raj (2015), "Behavioral Economics and Public Policy: A Pragmatic Perspective," Richard T. Ely Lecture, *American Economic Review: Papers & Proceedings 2015*, 105(5): 1–33.

Biases in Statistical Reasoning

26. Kahneman, Daniel, and Amos Tversky. (1974): "Judgment under Uncertainty: Heuristics and Biases," *Science*, 185: 1124-1131.
27. Kahneman, D, and A. Tversky. (1983): "Extensional vs. Intuitive Reasoning: The Conjunction Fallacy in Probability Judgment," *Psychological Review*, 90(4): 293- 315.

28. Tversky, Amos, and Derek Koehler, (1994): "Support Theory: A Nonextensional Representation of Subjective Probability," *Psychological Review*, 101(4): 547-567.
29. Kahneman, D., and Tversky, A. (1972): "Subjective probability: a judgment of representativeness," *Cognitive Psychology*, 3(3): 430-454.
30. Tversky, A., & Kahneman, D. (1973): "Availability: a heuristic for judging frequency and probability," *Cognitive Psychology*, 5(2): 207-232.
31. Rabin, Matthew and Joel Schrag. (1999): "First Impressions Matter: A Model of Confirmatory Bias." *Quarterly Journal of Economics*, 114(1): 37-82.
32. Madarasz, Kristof. (2012): "Information Projection: Model and Applications," *Review of Economic Studies*, 79 (3): 961-985.
33. Griffin, D. and A. Tversky. (1992): "The Weighing of Evidence and the Determinants of Confidence," *Cognitive Psychology*, 24: 411-435.
34. Rabin, Matthew. (2002): "Inference by Believers in the Law of Small Numbers." *Quarterly Journal of Economics*, 117(3): 775-816.
35. Rabin, Matthew and Dimitri Vayanos. (2010): "The Gambler's and Hot-Hand Fallacies: Theory and Applications." *Review of Economic Studies*, 77(2): 730-778.
36. Benjamin, D., M. Rabin, and C. Raymond. (2015): "A Model of Non-Belief in the Law of Large Numbers," forthcoming, *Journal of the European Economics Association*.
37. Benjamin, Dan, Aaron Bodoh-Creed, and Matthew Rabin. (2013): "The Dynamics of Base-Rate Neglect," Non-Existent Working Paper, UC Berkeley.
38. Camerer, Colin F. (1989). "Does the Basketball Market Believe in the Hot Hand?" *American Economic Review*: 1257-1261.
39. Miller, Joshua Benjamin, and Adam Sanjurjo (2014). "A cold shower for the hot hand fallacy."
40. Green, Brett S., and Jeffrey Zwiebel (2015). "The Hot-Hand Fallacy: Cognitive Mistakes or Equilibrium Adjustments? Evidence from Major League Baseball: Evidence from Major League Baseball."
41. Tversky, Amos, and Thomas Gilovich (1989). "The 'hot hand': Statistical reality or cognitive illusion?" *Chance* 2(4), 31-34.
42. Tversky, Amos, and Thomas Gilovich (2005). "The Cold Facts About the 'Hot Hand' in Basketball." *Anthology of Statistics in Sports*: 169.
43. Benjamin, Dan, Don Moore, and Matthew Rabin. (2017): "Misconceptions of Chance: Evidence from an Integrated Experiment." Working Paper, UC Berkeley.

Measuring Beliefs

44. Manski, Charles F. (2004), "Measuring Expectations." *Econometrica* 72 (5): 1329–76. <https://doi.org/10.1111/j.1468-0262.2004.00537.x>.
45. Armantier, Olivier, Wändi Bruine de Bruin, Simon Potter, Giorgio Topa, Wilbert van der Klaauw, and Basit Zafar (2013), "Measuring Inflation Expectations." *Annual Review of Economics* 5 (1): 273–301. <https://doi.org/10.1146/annurev-economics-081512-141510>.
46. Armantier, Olivier, Wändi Bruine de Bruin, Giorgio Topa, Wilbert van der Klaauw, and Basit Zafar (2015), "Inflation Expectations and Behavior: Do Survey Respondents Act on Their Beliefs?" *International Economic Review* 56 (2): 505–36. <https://doi.org/10.1111/iere.12113>.
47. Engelberg, Joseph, Charles F. Manski, and Jared Williams (2009), "Comparing the Point Predictions and Subjective Probability Distributions of Professional Forecasters." *Journal of Business & Economic Statistics* 27 (1): 30–41. <https://doi.org/10.1198/jbes.2009.0003>.
48. Armona, Luis, Andreas Fuster, and Basit Zafar (2018), "Home Price Expectations and Behavior: Evidence from a Randomized Information Experiment." *The Review of Economic Studies*, Forthcoming. <https://doi.org/10.1093/restud/rdy038>.

49. Delavande, Adeline, and Susann Rohwedder. 2008. "Eliciting Subjective Probabilities in Internet Surveys." *Public Opinion Quarterly* 72 (5): 866–91. <https://doi.org/10.1093/poq/nfn062>.
50. Prelec, Dražen (2004), "A Bayesian Truth Serum for Subjective Data." *Science* 306 (5695): 462–66. <https://doi.org/10.1126/science.1102081>.
51. Trautmann, Stefan T., and Gijs van de Kuilen (2014), "Belief Elicitation: A Horse Race among Truth Serums." *The Economic Journal* 125 (589): 2116–35. <https://doi.org/10.1111/econj.12160>.
52. Harrison, Glenn W., Jimmy Martínez-Correa, and J. Todd Swarthout (2014), "Eliciting Subjective Probabilities with Binary Lotteries." *Journal of Economic Behavior & Organization* 101: 128–40. <https://doi.org/10.1016/j.jebo.2014.02.011>.

Beliefs and Education

53. Bleemer, Zachary, and Basit Zafar (2018), "Intended College Attendance: Evidence from an Experiment on College Returns and Costs." *Journal of Public Economics* 157: 184–211. <https://doi.org/10.1016/j.jpubeco.2017.11.002>.
54. Conlon, John (2018), "Major Malfunction: A Field Experiment Correcting Undergraduates' Beliefs about Salaries." *Working Paper*. <https://papers.ssrn.com/abstract=2965743>.
55. Betts, Julian R (1996), "What Do Students Know about Wages? Evidence from a Survey of Undergraduates." *The Journal of Human Resources* 31 (1): 27–56. <https://doi.org/10.2307/146042>.
56. Arcidiacono, Peter, V. Joseph Hotz, and Songman Kang (2012), "Modeling College Major Choices Using Elicited Measures of Expectations and Counterfactuals." *Journal of Econometrics* 166 (1): 3–16. <https://doi.org/10.1016/j.jeconom.2011.06.002>.
57. Zafar, Basit (2011), "How Do College Students Form Expectations?" *Journal of Labor Economics* 29 (2): 301–48. <https://doi.org/10.1086/658091>.
58. Zafar, Basit (2013), "College Major Choice and the Gender Gap." *Journal of Human Resources* 48 (3): 545–95. <https://doi.org/10.1353/jhr.2013.0022>.
59. Wiswall, Matthew, and Basit Zafar (2015), "How Do College Students Respond to Public Information about Earnings?" *Journal of Human Capital* 9 (2): 117–69.
60. Jensen, Robert (2010), "The (Perceived) Returns to Education and the Demand for Schooling." *Quarterly Journal of Economics* 125 (2): 515–48. <https://doi.org/10.1162/qjec.2010.125.2.515>.
61. Wiswall, Matthew, and Basit Zafar (2015), "Determinants of College Major Choice: Identification Using an Information Experiment." *The Review of Economic Studies* 82 (2): 791–824. <https://doi.org/10.1093/restud/rdu044>.
62. Delavande, Adeline, and Basit Zafar (2018), "University Choice: The Role of Expected Earnings, Non-Pecuniary Outcomes and Financial Constraints." *Working Paper*.

Biases in Social Reasoning

63. Eyster, Erik, and Matthew Rabin. (2005): "Cursed Equilibrium." *Econometrica*, 73(5): 1623-1672.
64. Esponda, Ignacio, and Emanuel Vespa (2014). "Hypothetical Thinking and Information Extraction in the Laboratory." *American Economic Journal: Microeconomics*, 6(4): 180-202.
65. Vallee, Boris, and Claire Celerier. "The Motives for Financial Complexity: An Empirical Investigation." *Working Paper*.
66. Carrillo, Juan D., and Thomas R. Palfrey. "No trade." *Games and Economic Behavior* 71.1 (2011): 66-87.

67. Carrillo, Juan D., and Thomas R. Palfrey (2009). "The Compromise Game: Two-Sided Adverse Selection in the Laboratory." *American Economic Journal: Microeconomics*, 1(1): 151-81.
68. Eyster, Erik, Matthew Rabin, and Dimitri Vayanos. (2015): "Financial Markets Where Traders Neglect the Informational Content of Prices." Forthcoming, *Journal of Finance*.
69. Jehiel, P. (2005): "Analogy-Based Expectation Equilibrium," *Journal of Economic Theory*.
70. Mullainathan, S., J. Schwartzstein, and A. Shleifer (2008): "Coarse Thinking and Persuasion," *Quarterly Journal of Economics*.
71. Esponda, I. (2008): "Behavioral Equilibrium in Economies with Adverse Selection," *American Economic Review*.
72. Shleifer, Andrei. (2000): "Inefficient Markets," Clarendon Lectures, Oxford University Press.
73. Gabaix, Xavier and David Laibson (2006), "Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets," *Quarterly Journal of Economics*, 121(2): 505-540.
74. Brown, Jennifer, Tanjim Hossain, and John Morgan (2010). "Shrouded Attributes and Information Suppression: Evidence from the Field" *Quarterly Journal of Economics* 125(2): 859-876.
75. Laibson, David and Leeat Yariv (2007), "Safety in Markets: An Impossibility Theorem for Dutch Books," working paper.
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