

# Applications of Psychology and Economics

EC895; Fall 2022

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## Our Outline:

- (1) Introduction
- (2) Psychology and Economics: The Topics
- (3) Psychology and Economics by Field
- (4) Methodology: Reading the Psychology Journals

I arrived at MSU in 2017. I don't have tenure (be nice).

This class is a grab-bag of material from:

- Harvard (graduate course)
- UC, Berkeley (graduate course)
- Another UC, Berkeley (graduate course)
- Random Caltech stuff
- ...so, yeah, it will be challenging. Hopefully, you'll find it fun!

## My research

I study a number of topics in psychology and economics, many which we will cover this term.

- PhD student. Graduate work in micro theory behind you.

Might have deeper interests in:

- Micro theory (not likely, statistically speaking)
- Econometrics (maybe)
- **Applied, empirical microeconomics (IO, labor, public finance, finance)**

## Guiding Idea

This course is for *everybody*, but especially those who will be working with data and want to think about how real people behave.

# New Year, New You

By the time most people reach this course, their *curiosity* for learning economics has waned a bit. (First-Yearitis)

My goal is to reignite that fire.

I want to remind you that there are a set of tools that are common to our profession and that we can profitably .

- Perhaps the deepest way to understanding our world is found from following the age-old wisdom *know thyself*.

Or, following the slightly-more-modern credo of Ted Lasso:

*Be curious, not judgemental.*

Everything will be posted on D2L.

Some stuff will inevitably be late or incomplete when first posted.  
Please have sympathy throughout the term: I am teaching this course because I genuinely want to help your career... but preparing a new course this late in my tenure clock is crummy.

The syllabus is there. Don't open it now. Read it later -- it's long.

But eventually, please read it. It is "required."

## Syllabus highlights:

- Grade is composed of problem sets, weekly (short) memos, a referee report, and either a paper or an empirical problem set
  - Problem Sets: 3 x 10%
  - Memos: 10 x 3%
  - Referee Report: 15%
  - Paper: 25%
- Details on the paper are on the syllabus.

## Readings (Week 1)

- No textbook.
- In general: if I assign stuff, it will be marked with a star, generally fairly light, and you really need to read it. (Please).
- Week 1:
  - "Psychology and Economics" (*Journal of Economic Literature*, 2009)
  - "Psychology and Economics: Evidence from the Field" (*Journal of Economic Literature*, 2009)
- Reading list on syllabus (guaranteed to undergo changes throughout term)

## General Information

Please email me ([bbushong@msu.edu](mailto:bbushong@msu.edu)) to schedule a "hello" meeting before end of next week.

Please be kind to me and others in this class. If I am doing a bad job, please tell me (politely).

Problem sets are how you'll learn the connection between theories and empirics. Consider this the most important thing for the first half of the term.

In the second half of the term, shift your focus toward your paper. Your paper *can* be something you're using for another purpose, or something that's half-baked, but producing real, substantive research is your priority as a 2nd or 3rd year.

If you are concerned about the style or substance of this course, please come talk to me.



## **I hate grading.**

Nevertheless, it is a part of the profession. (If you've graded before, you've had this pain already.)

## A note on grades:

You are done with the part of your education where it's useful to focus on grades. I want you to learn a lot... the assignments are there to *help you*.

- In brief: Don't obsess about grades.

Okay fine there are obviously some type A folks in here. Here's your "rubric":

- Learned some stuff → 4.0
- Learned very little stuff → 3.5
- Learned basically nothing → 3.0
- Never came and did nothing, learned nothing → sadness. (Either yours or mine).

Because this is a new course:

- Some of the lectures might be too long or too short. (Almost surely too long).
- Some of the content won't make sense (mostly due to me making verbal misstatements or algebraic errors)
- Some of the time I'll forget what I intended to say and awkwardly stare at you for a few moments (sorry).

Please comment throughout the course, not just at the end.

The material will improve with time and feedback.

I encourage thoughtful feedback and thoughtful responses to questions. If I call on you and you don't know immediately, don't freak out. Take your time. Relax. If you don't know after a minute, it's okay to say you don't know.

- I will try to avoid asking questions that you won't know.

In short, behavioral economics attempts to incorporate more realistic assumptions into economics, both to better understand the behaviors we see in the world and to improve our analyses of welfare and policy.

**Our (specific) goal in this course:** To use and embrace the

- substance
- techniques
- annoying mathematical notation, and, most importantly,
- goals
  - tractable models with economic consequences
  - (not mere psychological accuracy)
  - ability to do comparative statics
  - calibrational relevance, and
  - *empirical implementability*

of standard economic analysis, but focus on introducing psychological factors often under-emphasized by economists.

In this class, we will take a slightly more direct approach.

We will always emphasize lessons that have empirical content.

Put a different way: we will heavily focus on empirical analysis---that is, how to *actually do stuff*.

Many people in the profession believe that the standard economic assumptions fail to fully capture the lived experience of people. We seek alternative assumptions with the belief that doing so will lead to better analysis and (ultimately) policies.

Some "standard" economic assumptions:

- People treat gains and losses symmetrically.
- People behave exactly as they plan.
- People care only about themselves (pure self-interest).
- People are Bayesian information processors.
- People behave in their own best interests.

Starting point for behavioral economics:

Evidence from psychology casts doubt on all of these (and other) "standard" assumptions.

A (sloppily-notated) version of the "standard" model (based on Rabin 2002, DellaVigna 2009):

The decision-maker maximizes:

$$\max_{x \in X} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) u_t(x | s_t).$$

- $X$  is the set of "life-time strategies" or choices the DM can take
- $S_t$  is the set of states of the world
- $p(s_t)$  are unbiased beliefs that arise from Bayesian updating
- $\delta \in [0, 1]$  is a (time-consistent) discount factor
- $u_t(\cdot | s)$  is *true* instantaneous utility at time  $t$  in state  $s$ ... typically making many ancillary assumptions about the texture of these preferences (e.g., self-interest, depends on final outcomes, etc.)

## Improving assumptions about preferences

$$\max_{x \in X} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) \textcolor{red}{u}_t(\textcolor{red}{x} | s_t).$$

1a. Improving assumptions about *hedonic* preferences:

- Typically: hedonic preferences depend only on final outcomes or absolute levels
- and hedonic preferences depend only on **own** outcomes.

1b. Improving assumptions about *decision* preferences:

- Typically: decision preferences  $\hat{u}$  equal hedonic preferences  $u$

## Reference-Dependent Preferences



- Medvec et al. (1995) present undergrad subjects headshots of 1992 Olympic silver and bronze-medal winners on the podium
- Subjects are asked to estimate medallists' happiness

**Check your intuition:** which group rates higher?



## Social Preferences

*From Dawes and Thaler (1988)*

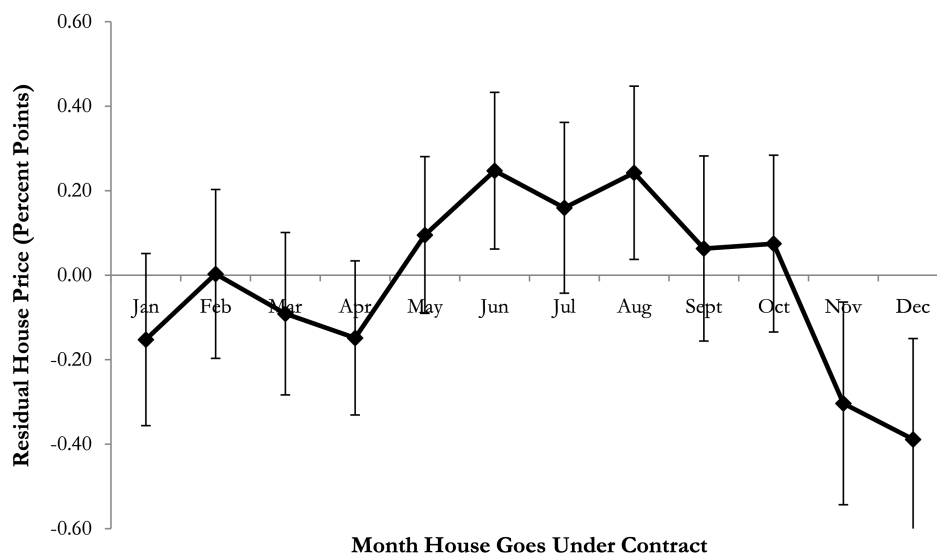
In the rural areas around Ithaca it is common for farmers to put some fresh produce on the table by the road. There is a cash box on the table, and customers are expected to put money in the box in return for the vegetables they take. The box has just a small slit, so money can only be put in, not taken out. Also, the box is attached to the table, so no one can (easily) make off with the money. We think that the farmers have just about the right model of human nature. They feel that enough people will volunteer to pay for the fresh corn to make it worthwhile to put it out there. The farmers also know that if it were easy enough to take the money, someone would do so.

## Projection Bias

*From Busse et al. (2012)*

Average residual for houses with swimming pools from regression:

$$\log(\text{Sales Price})_{ict} = \gamma_i + \theta_{ct} + \varepsilon_{ict}$$



Improving assumptions about beliefs

$$\max_{x \in X} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) u_t(x | s_t).$$

1. Improving assumptions about *beliefs*:
2. Improving assumptions about people's understanding of--and attention to--the decision environment,  $x \in X$ .
  - Typically: People fully understand and pay complete attention to the incentives in place in the environment they operate in

Lots of other things!

## Two (equivalent) facts:

1. If one observes high rates of return on investment, one should also observe high rates of growth of consumption
2. If consumption is not growing rapidly, one should not observe unexploited high-return investments

## The Puzzle:

High returns to capital are observed in **many** contexts (Banerjee and Duflo, 2005)

- But we see borrowing at very high rates (e.g., fruit vendors in Chennai who borrow at daily rates of 5%; Karlan, Mullainathan and Roth 2018)
- High returns to small-business grants (de Mel et al., 2008)
- High returns to inventories (Kremer, Lee, Robinson, Rostapshova, 2013)
- Predictable large increases in prices between seasons (Burke et al., 2018)

Suppose production function  $F(K)$  with  $F'(K) \geq 0$  and  $F''(K) \leq 0$ .

Standard Euler equation links consumption growth to marginal return to capital:

$$u'(c_t) = \delta F'(K_t) u'(c_{t+1})$$

This implies (unrealistically) high consumption growth rates.

- If log utility,  $F'(K) = 50\%$  annually, and  $\delta = 0.96$ , then  $\frac{\dot{c}}{c} = 44\%$ .
- If constant intertemporal elasticity of substitution utility with  $\sigma = 2$ , then  $\frac{\dot{c}}{c} = 20\%$ .
- Still implies 38-fold consumption growth in 20 years.

This implies an absurdly high "tax" or discount rate to resolve puzzle.

Maybe people don't invest because investments (e.g. fertilizer) are risky? Suppose income in period  $t$  is:

$$Y_t = Y_0 + \epsilon_t + \sum_{i=1}^n \mu_{i,t} F_i(K_{i,t}),$$

where there are  $n$  assets/capital goods with an arbitrary pattern of correlation.

## Stochastic Euler equations:

$$u'(c_t) = \delta \mathbb{E}_t[\mu_{i,t} F'_i(K_{i,t}) u'(c_{t+1})], \quad i = 1, 2, \dots, n$$

Given initial capital stock, risk aversion will:

- Reduce investment in assets which covary positively with consumption
- Increase investment in assets which covary negatively with consumption

If people are patient, risk averse, and subject to large shocks, they should demand large safe buffer stock. At any one time, only a few people should have low buffer stock.

This implies that, for majority of people, consumption should not move much with:

- high-frequency income shocks
- predictable income changes (e.g. seasons)

This implies that, for example, if returns to fertilizer highly correlated with income in season, they should be only modestly correlated with lifetime income and thus consumption

(or beta of fertilizer investment will be modest, and risk aversion will only modestly reduce fertilizer investment)

## The Facts:

- Liquid buffer stocks are often modest.
- Consumption covaries with income, including predictable income.
- Karlan et al. (2014) find that rainfall insurance increases fertilizer use.



In this class, we will consider a number of possible explanations for these facts including:

- Time preferences
- Loss aversion
- Biased beliefs
- Social preferences
- Projection bias
- ...and other stuff

## Flow of Each Topic

- Briefly review the standard model.
- Discuss evidence that contradicts the standard model
- Discuss prominent alternative model(s) motivated by that evidence.
- Investigate the predictions of that alternative model for economic applications.
- Focus: empirical tests of these predictions (when such tests exist).

Since psychology and economics touches nearly every field, I will do my best to introduce material from a wide variety of angles.

Below are some examples of the infinite possibilities for your own work. Under each broad umbrella (field), I have listed a few examples of applied psychology and economics.

## (1) Public Finance

- Present-bias (addiction, sin taxes, retirement savings)
- Limited attention (incidence of taxes, low take-up of benefits)
- Social preferences (charitable contributions)

## (2) Development Economics

- Present-bias (commitment devices in savings, choice of crops, insurance)
- Limited attention (failure to adopt new, helpful technologies)
- Social preferences (group savings, trust, ethnic hatred)
- Risk preferences (crop insurance)

## (3) Asset pricing

- Overconfidence (overtrading)
- Limited attention (footnotes in accounting, demographics, large events)
- Extrapolation (overinference)
- Market Reaction (noise traders)



## (4) Corporate finance

- Overconfidence (investment, mergers, options)
- Reference dependence (mergers, reporting, earnings guidance)
- Limited attention (media)

## (5) Labor Economics

- Present Bias (job search, effort)
- Reference dependence (labor supply, wage setting, job search)
- Social preferences (wage setting, effort)
- Overconfidence (job search)
- Money Illusion (wage setting)
- Limited Attention (job vacancies, migration)

## (6) Health Economics

- Present-Bias (default effects; obesity; commitment devices)
- Limited Attention (plan choice)
- Context Dependence (health plan choices)



## (7) Education Economics

- Limited attention (major choice, FAFSA form)
- Present-Bias (returns to education)
- Social norms (acting white)

## (8) Economics of Crime

- Cue-based behavior (violent crime)
- Present-bias (disregard for future)

## (9) Industrial organization

- Present-bias (Credit cards)
- Reference dependence (sales, optimal contracting)
- Behavioral firms (general errors in maximizing revenue)



## (10) Environmental Economics

- Social comparisons (energy savings)
- Limited Attention (energy savings)
- Reference dependence (value of paying to avoid disasters)
- Framing effects (value of a life)

## (11) Law and Economics

- Present-bias (Cooling off period)
- Emotions (litigation)
- Order Effects and mood (judicial decisions)

## (12) Macroeconomics of Consumption and Savings

- Present-bias (low saving + mostly illiquid wealth)
- Reference dependence (nominal wage rigidity)
- Limited attention (menu costs)
- Experience effects (inflation expectations)

The (most common?) strategy for papers in Psychology and Economics:

- Get an idea from reading psychology literature
- Think of a simple economic setting where the effect matters
- "Model" your new phenomena (either by borrowing your model from others or by applying it in your specific setting)

At this point the path typically diverges depending on skill sets. You can either

- Test your new approach with economic experiments (I do this.)
- Apply your approach to field data (You will do this. I also sometimes do this.)

But the starting point: how do you dive into the psychology literature?



Not all kinds of psychology research are immediately helpful. Some are actively bad to explore.

- Social Psychology (e.g., attribution errors, emotions, discrimination). **Big thumbs up**
- Cognitive Psychology (e.g., Kahneman and Tversky papers). **Medium thumbs up** (a bit picked over and might feel like "everything has been done". Not true, but I would understand that reaction.)
- Personality Psychology (e.g., Big Four). **Mild thumbs down.** (Michigan, NYU groups are bullish; I haven't tasted the fruit from that work.)
- Developmental Psychology (e.g., growing of skills in children). **Big thumbs down**
- Comparative Psychology (e.g., "hispanics are less overconfident than whites"). **Question mark?**

Even more so than economics, restrict your attention to the top journals. For psychology these include:

## 1. Journal of Personality and Social Psychology (JPSP)

- Mostly very high-quality experiments
- When reading these, go directly to design
- Do not stop at summary of the design; psychology characterizations of designs sometimes don't match actual experiment. Try to read for details as much as possible.
- Skip the subsection of the journal dedicated to personality psychology

## 2. Psychological Science

- Relatively recent journal, extremely successful
- Publishes short articles (as in Science, Nature).
- Recently led charge in raising publication standards

## 1. Psychological Bulletin

- Publishes mostly reviews

## 2. Psychological Review

- Publishes "theoretical" contributions, i.e., attempts to summarize existing experimental evidence. Can be tough to translate to economics-speak.

Top marketing journals can be useful (e.g., Journal of Consumer Research or Journal of Marketing Research).

Do not go for the newest finding. Look for findings that have been replicated, preferably by different researchers. (Use Google Scholar cite counts as a loose proxy for reliability, but be a bit wary).

Psych articles will contain typically 3-6 experiments. Focus on strongest one or two. Vignette studies can be better than expected, so don't immediately dismiss those.

Classical issues to look for:

- Sample sizes too small?
- Effect too large? (Do a back-of-the-envelope calculation for yourself!)
- Are outcome variables interesting to economists? Deception?
- Psych authors tend to claim that they found a new effect – look for the unifying theme across papers.

## Reading Group

I am hosting a reading group. Totally optional.

First, try criticizing the findings. Take the negative approach and ask: *Does this explain something that is relevant for economics?* Or try asking: *Is this a first-order effect?* Finally, check other formal models and ask: *Can existing economic models explain the effect (within the domain of economics)?*

- Many times, psychology effects stem from an informational assymetry. Use your training and look at things formally and carefully.

Second, if something passes the sniff test, dive into the economic problem you think is most relevant.

- When you need to brainstorm, be agnostic about "fields" within economics.

Lastly, look for related papers in economics (and psychology).

Caveat: Often this won't work.

But learning is a real step toward research and we shouldn't stop engaging in the process.