# An Introduction to Economics and Labor Economics

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#### Disclamer

99% of the content you will learn in this course is just what I have learned from somewhere else



If I have seen further it is by standing on the shoulders of Giants.

- Isaac Newton (1855)

#### Roadmap

#### 1. Introduction

- 2. What is Economics
- 3. What is Labor Economics
- 4. How to learn (Labor) Economics
- 5. The last

#### Introduction

- ▷ Me: Econ BA Fin MA H Fund EH MA Econ MA Econ PhD
- I suspect, like myself once be, many econ students have unclear or incorrect perceptions about what economics is, what economists do, and how to learn economics
  - ▷ Some information missing or hidden in standard curriculums
  - > Many myths and misunderstandings about economics in society
- $\triangleright$  This talk
  - addresses and clarifies some of these misperceptions
  - ▷ introduces labor economics, arguably the best field to illustrate how economists perceive the world
  - showcases some learning techniques and resources
- ▷ Many are "my own views"; You should be 'Bayesian' (and w/o too strong priors) about Bayesian and priors/posteriors

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#### What is Economics?

- ▷ Common view: money, business, finance, stock market, ... the meme
- A tricky view: what economists study
  - ▷ Media/Private-sector economist ≠ Academic economist (illustration)
  - An analogy: skydiving coach vs physicist
- Academic economists' common view:
  - ▷ "allocation of scarce resources"
  - ▷ "constrained decision-making"
- Alfred Marshall: "the study of mankind in the ordinary business of life"
- My take: the study of any human behavior not solely due to biological/physical reasons

#### What exactly is Economics?

- ▷ Various fields and topics ▶ fields
- ▷ Theory vs. Empirics; Macro vs. Micro; Reduced vs. Structural; ...
- No "principals" or "laws"; Only tools, paradigms, and some temporary consensus
- Significant disputes exist over the suitable tools and many arguments, explanations, and predictions
- No representative agent for economists (though they often assume), so be careful when hearing "Economists say ..."

► one example pertain to minimum wage → though there does exist some typical images for different schools

You might be unfamiliar with this type of chaos, but welcome to the real world

# Some myths about Economics

#### 1 "Economics is all about unrealistic assumptions"

- ▷ "relevant question ... is not whether they are descriptively 'realistic', for they never are, but whether they are sufficiently good approximations for the purpose at hand" – Milton Friedman (1953) ▷ more on "good approximation"
- $\triangleright$  "All models are wrong, but some are useful" George Box (1978)
- 2 "Economics is not science" what is science what is not science
  - Modern economics, while for sure way less accurate than many other subjects like physics, does follow the same scientific paradigm

#### 3 "If economics is useful, economists would be billionaires" . details

- ▷ Again, physicists need not be good at sky-diving or flying
- Economics is increasingly important in policy making or at least in thinking about policy making

also depends on if you prefer positive or normative economics

#### 4 "Economics is over-mathematic" • details

Math is just another "language" that has been proven more powerful in logical thinking (induction and deduction) than natural language

# Key concepts in Economics

#### ▷ Supply & Demand

- Optimization / Incentives
- > Tradeoff / Marginal benefits vs. Marginal costs
- Equilibrium
- Efficiency / Market failures
- ▷ Institution

Estimation / Causal inference / Counterfactual

# Theoretical vs. Empirical

- Economics before 1990s: theory dominated
- Economics today: empirical works dominate
  - ▷ Credibility revolution (largely by labor economists!); "Causality" ▶ example
- Both are important (many economists do both!)
- ▷ However, we will **focus mainly on theory** because
  - ▷ 1 You need theory to formalize ideas, design empirical tests, and explain empirical results
  - > 2 We only have limited resource (time)
  - ▷ 3 Some of you might be not well-prepared for metrics yet
- ▷ But good theories are often motivated by empirical facts → example

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#### What is Labor Economics?

- > Labor economics study the aspects of everyone's entire life
- Marriage, Family, Child birth
- ▷ Education, Training, Human capital
- ▷ Work, Leisure, Home Production
- ▷ Job, Career, Tenure, Unemployment, Retirement
- Wage, Amenity, Inequality, Discrimination
- Many other subtopics and relevant topics

 $\,\triangleright\,$  Also connected with macro, public, trade, urban, dev, org, ...

# What is Labor Economics?

Study these life events and issues through the lens of economics tools

- 1. Look at "data" to find stylized facts and economics questions
- 2. Theoretical explanations of empirics
  - ▷ (Potential outcomes framework: trivial example, serious intro video)
  - Micro theory
  - ▷ Macro theory

(Not mutually exclusive but mainly different in configurations due to different modeling interests, e.g. partial vs. general equilibrium)

- 3. Empirical testing of theories
  - Reduced form estimation ~>> Casual inference
  - Structural estimation ~> Model estimates / Counterfactual
  - ▷ Calibration → Model fitting / Counterfactual (For the tension between the first two styles of applied econometrics, see <u>David Card's take</u>, <u>Phil Haile's slide</u>, and also <u>a recent reconcile</u>; The last matches quantitative macro models to data)
- 4. Policy implication, evaluation, and simulation; Prediction

#### Why fertility rate decline over time?

Figure 1: Total Fertility Rates since 1850



#### Why schooling years increase over time?

Figure 4: Average Years of Schooling since 1870, Selected Countries



Notes: Data on average years of schooling comes from Barro and Lee (2013).

#### What determines the return to schooling?



Figure 1. Unrestricted Schooling-Log Wage Relationship and Mincer Earnings Specification

# Why has inequality increased?



FIGURE 1. CUMULATIVE CHANGE IN REAL WEEKLY EARNINGS OF WORKING-AGE ADULTS AGES 18-64, 1963-2017

#### Are male and female workers paid equally?





*Note:* The figure reports female labor participation (25 to 54 years old) around the world, as a function of log GDP per capita (purchasing power parity (PPP) based), for the years 1990 and 2017.

Source: World Bank and ILO



#### FIGURE 2. SHARES OF MEN AND WOMEN WITH AT LEAST A BACHELOR'S DEGREE

#### How does education affect marriage?

Figure 3: Marital rates among 35-44 years old over time, by education and gender



Table 1: Marriage Matching Frequencies by Education

	Low Education Men	Medium Education Men	High Education Men
Low Education Women	0.16	0.06	0.03
Medium Education Women	0.13	0.25	0.11
High Education Women	0.03	0.05	0.17

Notes: Low Education includes either only high school degree or a middle school degree plus basic vocational education (with < 11 years of schooling). Medium Education includes any secondary degree plus vocational education (with  $\ge 11$  years). High Education is defined as college or more. We consider an individual's maximum educational attainment and keep only one observation per couple.

## **Policy questions**

- What policy can encourage more marriage and child birth?
- Does immigration hurt the employment of local workers?
- Should we make college less expensive or entirely free ?
- How to encourage more female participation into STEM majors?
- Should gov prevent AI to replace human workers?
- Should gov increase the minimum wage more?
- Should gov subsidize the unemployed or have universal pay?

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#### To be honest

#### ▷ The fundamental (incentive) problem of college education

- Students care more about scores than content
- Lecturers care more about content than scores
- You are likely to not remember many of the economics and labor economics learned unless you pursue a career in economics
  - Depreciation of human capital
  - Mismatch between skills hold and tasks conducted (Even if you pursue a career in econ, you find this happens <u>all the time</u>)
- ▷ Knowing labor economics itself does not guarantee you a job
- ▷ No, GPA is not important in the long-run

# What is the goal

- ▷ Know some economic concepts and mechanisms
- ▷ Know some economic stylized facts
- ▷ Know what is modern economics and what economists study
- ▷ Learn the economic way of thinking
- Learn how to figure out something that you don't understand in an economics (and "scientific") way
- Enjoy some intellectual interests
- ▷ You find economics is interesting and decide to learn more

# Why undergraduates may dislike study

- Analyzing this question can be exactly economics
- Student's problem:  $\max_e V \cdot p(\operatorname{credit}|e) c(e) + u(T e)$  $\triangleright$ 
  - $\triangleright$  e represents study time or effort; T is total time or effort
  - $\triangleright p(\cdot)$  indicates the conditional probability of getting credit;
  - $\triangleright$  V is the overall return (discounted present value) of getting credit;
  - $\triangleright c(\cdot)$  is the disutility function of study;  $u(\cdot)$  is the utility from leisure
- $\triangleright \text{ Tradeoff (from <u>FOC</u>): } \underbrace{V \cdot p'}_{V \cdot p'} = \underbrace{c' + u'}_{V \cdot p'}$

marginal benefits marginal costs

- This simple toy model approximates your daily life consideration (In fact I found a recent econ paper that exactly studies this!)
- $\triangleright$  It can also give prediction: you will ask most questions about p' as it varies the most across classes
- ▷ Note the implicit assumption here: V is not a function of e; in other words, college education itself does not gives you value (Q: true?)

# Why undergraduates may dislike studying economics

- Basic theories are often over-simplified and unrealistic models
- ▷ Not the types of math you are familiar with in your h-school
- Abstract thinking might seem overwhelming and unrelated to the real world
- ▷ Moreover, undergraduate contents are often not self-contained
- Better consider them as foundational tools rather than rigid principles
- A bit like sports, you need some basic and often seemingly unrelated training to have fun

## Learning materials

#### ▷ Slides

- ▷ We are going to draw the "right" owl → draw an owl
- ▷ I try to be as self-contained as possible, but "it's easy to see ..."
- ▷ This results in each slide being overcrowded and overwhelmingly wordy (You should **not** do this in your own presentation!)
- Textbooks are not required though maybe helpful if you really struggle to understand the basics or want to know more details
  - ▷ E.g. George Borjas's Labor economics textbook
- ▷ There are **many many free econ materials** on the internet:
  - materials for doing empirical works
    - Esp. elementary ones, e.g., <u>CORE Econ textbooks</u>, <u>Ashley Hodgson's youtube videos</u>, <u>Nick Huntington-Klein's youtube videos</u>, ...
    - Publicly available undergraduate and postgraduate lecture notes that cover from elementary to advanced content (see my list)
    - Survey papers in <u>Journal of Economics Perspectives</u> and <u>Journal of Economic Literature</u> if you want to have some board and in-depth exploration and know the frontier (can also search <u>here</u>)

## You will not understand 100% of the slide

- Each class's slides took me days or weeks to build and years of study to fully understand (I hope)
- Why not teach only the very basics in a high-school style so that (almost) everyone can understand?
  - i the left owl is rather useless
  - ii you can learn them by yourself
  - iii more content but less time
  - iv I dislike "just to memorize ..."
- I usually only understand around 10-30 percent of content during <u>a seminar</u> if I didn't read the paper in advance
- Almost everyone struggle to learn difficult stuffs (one example)
- ▷ So read the slide before the class and bring your questions

# You will not understand 100% of the slide

- I put some questions in the slide (with "Q:") so that you can test if you truly understand when reading (I often not)
- I put more advanced content in the **appendix**, which caters for graduate students or challenging undergraduates
- ▷ It's fine to not understand 100%; It requires back and forth
- $\triangleright$  Key is to
  - i learn the "intuition"
  - ii be familiar with economics-type of thinking
  - iii practice using economics tools
  - iv build confidence on dealing with hard stuffs

#### Learn the intuition and try to apply

- Economics terminologies/logics are abstract
- ▷ Math or drawing graphs are tools but not purpose
- Key is to understand the "intuition" (check "Feynman technique")
  - Explain it like I am 5
  - Recall the entire logic chain in your mind
  - Create your own examples or analogies
- Still need to practice and be familiar with math and drawing as they are essential and useful tools
- ▷ Try applying them to study your own problems
- There is nothing to "memorise"; It's more like learning to ride a bike, though a much harder one

#### Feynman on reading difficult stuffs

Well, I asked him, "How can I read it? It's so hard." He said, "You start at the beginning and you read as far as you can get, until you are lost. Then you start at the beginning again, and you keep working through until you can understand the whole book."

—Joan Feynman, Richard Feynman's sister, recalling a discussion with her brother

Taken from No Ordinary Genius.

### Should "I" ask a question in the class?

- ▷ Short answer: yes!
- ▷ A bit longer: yes because there is positive externality
- ▷ Even longer: let's write down a toy model → see here

# What if you don't understand something off the class

- Scientific knowledge needs to be understandable by anyone with sufficient prerequisite skills (otherwise it's arts)
- ▷ Step 1: read the material from beginning once again
- Step 2: write down your question
- ▷ Step 3: guess what knowledge you may lack for understanding
- Step 4: search your question or the lacking knowledge through other materials (textbook; lecture notes; Econ StackExchange; ...)
- Step 4.5: ask or confirm with GPTs (with caution as it is a pre-trained "stochastic parrot")
- Step 5: post the formalized question and your attempts on the discussion board of K-LMS or email to me

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#### Last words (from Feynman)



# "Knowledge isn't free. You have to pay attention."

- Richard P. Feynman

#### Assignment 0

(a)

- ▷ Consider a labor economics topic you are curious about
- Find a recent publication in one of the leading economics journals about this topic and try (roughly) understand what it is about
- Find one of the mostly cited (and currently active) scholars on this topic and her/his website
- Try figure out what this scholar has done in the past and is currently working on

(b)

▷ Try remember the Greek Alphabet → see the table here

# Appendix



# Bayesian (cont.)

- > Theory: sun is a yellow dwarf which does not explode
- ▷ Assume thus a near 0 prior probability:  $P(exploded) = 1/(4.38 \times 10^{13})$
- $\triangleright$  *P*(yes|exploded) = 35/36

P(yes) = P(yes|exploded)P(exploded) + P(yes|not)P(not) $\approx 35/(36 * 4.38 \times 10^{13}) + 1/36$ 

- ▷ The posterior probability (<u>"Bayes' theorem"</u>):  $P(\text{exploded}|\text{yes}) = \frac{P(\text{yes}|\text{exploded})P(\text{exploded})}{P(\text{yes})}$   $\approx \frac{1}{1.25 \times 10^{12}}$
- Or we can wait for 8 minutes

#### Bayesian (economics version)

- ▷ Prior belief: P(econ is nonsense) = 0.9
- $\triangleright$  *P*(X says econ is not nonsense|econ is nonsense) = 0.5
- $\triangleright$  *P*(X says econ is not nonsense) = 0.9 × 0.5 + 0.1 × 1 = 0.55
- ▷  $P(\text{econ is nonsense}|X \text{ says econ is not nonsense}) = 0.9 * 0.5/0.55 \approx 0.82$
- ▷ (Q: try test what if your prior belief is 0.999)
- > You can consult multiple Xs (but not Ys as below)
- $\triangleright$  *P*(Y says econ is nonsense) = 0.9 × 1 + 0.1 × 1 = 1
- $\triangleright$  *P*(econ is nonsense|Y says econ is nonsense) = 0.9/1 = 0.9

#### What Economists do **•** back

# Economists



What my friends think I do



What my Mom thinks I do



What society thinks I do

SHOULD! SHOULD! SHOULD!

15! IS!



What the government thinks I do



What I think I do



What I really do

#### Economic fields **• back**

- Macroeconomics, Microeconomics, Econometrics, Labor Econ, Development Econ, Industrial Organization, Public Econ, Trade & International Econ, Urban Econ, Health Econ, Environment Econ, Organizational Econ, Behavior Econ, Political Econ, Economic History, ... (check the JEL codes)
- ▷ Finance, Management, and Marketing are near relatives
- Sociology, Psychology, Politics, ... are distant relatives, distinguish by both the topics studied and the tools used (with some overlap)

The evolution of Economists' views on if raising US federal Minimum Wage to a high level will lower employment of low-wage workers •••••



#### The federal minimum wage has been fixed at \$7.25 since 2010 (source)

# "A Comprehensive Guide to Social Scientists" • back

#### a comprehensive guide to Social Scientists



#### **Network Analyst**

- Once rare, now forms giant swarms
- Has no concept of what endogeneity is
- Working on cool new measure of centrality
- Constantly trying to migrate to West Coast



#### Sociologist

- Lives behind paywalls
- Has no concept of what endogeneity is
- Can only sting enemies once
- Will sting self repeatedly



#### Macroeconomist

- Ideas should not be able to fly
- Makes living from endogeneity
- Constant buzzing sound
- Comes in Salt and Freshwater varieties



#### Political Scientist

- Evolved stripes to look like Microeconomist
- Actually quite harmless; even friendly
- Gelman knows what endogeneity is
- Secretly pines for social-democratic hive



#### **Political Theorist**

- Oldest of all bee-like creatures
- Can be repeatedly swatted but not killed
- Not sure why it is in this picture
- Can waggle-dance the Melian Dialog



#### Microeconomist

- Interrupts constantly, wants to sting you
- Endogeneity is only concept it knows
- Insists it is smartest bee
- Not a real bee



#### Anthropologist

- Comes in four distinct varieties
- Rejects "Bee" label as imperialist
- Only exists because of imperialism
- Used to know a surprising amount of math



#### Social Psychologist

- Feeds on Undergraduates
- Stings journalists
- Underpowered in flight
- Drags rear pod of retractions

# Myth 1. Economics is all about unrealistic assumptions

back

- "Economics is only about unrealistic assumptions and is totally irrelevant to the real world"
- ▷ Milton Friedman: "relevant question about the 'assumptions' of theory is not whether they are descriptively 'realistic', for they never are, but whether they are sufficiently good approximations for the purpose at hand"
- ▷ "All models are wrong, but some are useful"
- In fact, today's economics is super rich in empirical studies, with some being utterly agnostic to any "economics" assumptions e.g. <u>this</u> and <u>this</u>, though perhaps not everyone think it is a good thing

# Why unrealistic assumptions & models can be useful?

back

- 1 Simplify complexity (to catch essences 
  Picasso's bull
  or to start with
  draw an owl
  )
  - Physics often start with "frictionless" or "spherical chickens in a vacuum" or "law of conservation of energy"
- $\triangleright$  2 As-If:
  - "The Selfish Gene"; Build robots that can run and pick baseball; ChatGPT
- > 3 Useful framework/ideology(/"fable")
  - Marginal utility decline; Opportunity cost; Sunk cost
- And in advanced economics, you can see how modern economists gradually approach to be more realistic

## Myth 2. Economics is not Science • back

- "Economics is not science as human mind cannot be modeled or tested"
- ▷ Science is not about finding/telling the truth → Popper & Kuhn
- ▷ Econ is science as it follows this loop
- Real problem: unlike Physics, it's way easier for the public to observe predictions of economic theories being wrong
- Economics theories are seldom, if ever, universally true, with test results frequently deviate
- ▷ Thus in some sense "more complex" and "more challenging"

#### Science is not about discovering truth •••••

- Scientists used to believe that they were pursuing truth
- ▷ Karl Popper: science is if falsifiable
- > Thomas Kuhn: science evolves via paradigm shifts
- ▷ More practical: contribute something new, interesting, and useful
- ▷ Yet, the public still believes science is about discovering truth.
- One should trust prevailing consensus within the scientific community, though often complex and not easily understood
- Science progresses through Bayesian learning
- Reference: Glen Weyl's Lecture 1; Richard McElreath's Chapter 1; or Harry Potter and the Methods of Rationality 1st half

## Myth 3. Economics has nothing useful •••••

- ▷ "If economics works, economists should be billionaires"
- In a way, ture: economics does not teach money-making, even in finance
- Many advanced research studies may have limited direct real-world applications
- ▷ But, again, physicists need not be good at sky-diving
- It's more about understanding how our human society works in a systematic and scientific way (just as any other science fields)
- ▷ It sometimes can be also as practical as engineering → e.g. replace bus engine
- Economics plays more and more important roles in policy making

#### Positive versus Normative Economics • back

(Ok I think the right figure is a bit unfair for normative economics but I just cannot find a good picture supporting normative economics; and sociologists might get angry about this

since they are often more normative; also see this video for examples)



Positive economics is the factual statements of "what is". Where as normative economics is opinion based statements on "what should be". #realworldeconszkryb r/X: R=AUR



"Positive economics is in principle independent of any particular ethical position or normative judgment. In short, positive economics is or can be an 'objective' science."

> Milton <u>Eriedm</u>an

#### Myth 4. Economics is over-mathematic • back

- Economics is often criticized for being overly mathematical
- ▷ Math is just another language like English or Python (thus "art")
- Math is created because nature human language is not good at logical thinking
- Math has proven to be useful for understanding and transforming the real world, though not very obvious in daily life
- Recounting history and presenting statistics (induction) is often not enough for constructive study
- While there are cases where loads of math being used for establishing some seemingly common sense,
  - ▷ Formalization is important as common sense can go wrong
  - ▷ Ultimately, it's about the people who use the tool, not the tool itself

#### Economics can teach you when to replace bus engine

back



#### "Correlation $\neq$ Causality" $\bullet \square \Bbbk$



THEN I TOOK A STATISTICS CLASS. NOW I DON'T.





#### Special relativity might not come from nowhere •••••



We all know that Einstein worked at the patent office after college but I had no idea about this:

"It can hardly be pure coincidence that, before gaining a university position, the young Einstein worked in the Swiss patent office, \*dealing specifically with patents relating to the synchronization of clocks at railway stations\*.

It was probably there that it dawned on him: the problem of synchronizing clocks was, ultimately, an insoluble one. In other words, only a few years passed between the moment at which we agreed to synchronize clocks and the moment at which Einstein realized that it was impossible to do so exactly."

This is a great book by the way: Carlo Rovelli, The Order of Time (pp. 61-62). ポストを翻訳

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#### How Picasso drew bulls .



#### How to draw an owl **back**



1. Draw some circles

2. Draw the rest of the fucking owl

# How realistic economics assumptions can be •••••

Me: so are the assumptions more realistic in econ102?

My professor:



Your lecturer when you ask if they're going to teach you how banks actually work



Fig. 3. Examples of cautionary tales.

## Self-learning materials of doing empirical works

- Some good (and free!) beginning level resource for self-learning doing empirical works:
  - Raj Chetty's public econ class;
  - ▷ Nick Huntington-Klein's online textbook;
  - Scott Cunningham's Causal Inference: The Mixtape
  - ▷ ...
- ▷ more and more <u>here</u>

# Should "I" ask a question in the class?

- ▷ Student *i*'s problem:  $\max_{I \in \{0,1\}} y(I) p(\text{stupid}) \cdot I \cdot c$
- $\triangleright y(1) p(\text{stupid}) \cdot c > y(0)$
- ▷ Now consider also other students in the class:  $y(1) - p(\text{stupid}) \cdot c > y(0)(1 - p(l^{-i})) + y(1)p(l^{-i})$
- ▷  $p(I^{-i})$  depends on  $I_i^*$  for all  $j \neq i$  in the class
- $\triangleright$  Consider a two-student case with one has c = 0 and one has c > 0
- $\triangleright$  In the equilibrium, only the one with c = 0 will ask the question
- > There is a positive externality here and free-riding
- ▷ When will there be a no-one-ask equilibrium? Is it efficient?
- ▷ How does the class size *N* matter?

#### How to do your own research

- $\triangleright\,$  The whole point is doing something new, interesting, and useful
- ▷ New question
  - New context
  - Missing why
- ▷ New theory
  - New setting
  - New mechanism
- New evidence
  - New data
  - New method
- Extending established work can be a good starting point

#### GreekAlphabet • back

GREEK ALPHABET

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