L&S 88

Health, Human Behavior, and Data

Prof. Ryan Edwards

Class 4
How to think like a health economist: Causal influences, variance

February 22, 2016
Today’s agenda

• Term papers

• Readings discussion

• Data exercise
Term papers

• I’m very impressed by your creativity and motivation

• Now is the time to get data and move ahead

• Getting data can be hard, and I’m here to help

• A term paper is all about meeting deadlines

• Don’t let the perfect be the enemy of the good
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Review Date</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Feb 5</td>
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<td>Feb 26</td>
<td>Produce one table or figure using your data</td>
<td>Apr 15</td>
<td>Mostly done draft</td>
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<td>Mar 4</td>
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<td>Mar 11</td>
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<td>Final draft</td>
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<td>Mar 18</td>
<td>Rough draft: One table or figure with written discussion</td>
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<td>Emailed response to final draft</td>
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Reminder: Office hours

• Tuesdays: 1-2pm, 2:30-5pm
• Thursdays: 1-2pm, 2:30-5pm

• If you can, email me before you drop by
Readings:

Bhattacharya, Health Economics

Chapter 3, the Grossman model of health capital
Chapter 4, socioeconomic disparities in health
Question 3.1

Is a person’s health like a Zachary’s pizza?
Or is it more like a laptop computer?
Or is it more like a bicycle?

A. The pizza. It takes time to bake a pizza, and leftovers last in the fridge

B. The laptop. You pay a lot at first

C. The bicycle. You buy it, and then you repair it

D. None of these. Health is like nothing else
According to the text, why would somebody with more education have better health?

A. Some people are endowed from birth with more
B. Some people are better at producing good health
C. Some people have better social networks
D. Some people live in better neighborhoods
Question 3.3

According to the text, why does health decline with age?

A. Because health depreciates more rapidly with age

B. Because education declines with age

C. Because the rate of return associated with other activities rises with age
Question 4.1

In countries with universal health insurance and care, are there any disparities in health between rich and poor people?

A. Yes, and they’re probably just as large as in the U.S. where health insurance isn’t universal

B. Yes, but they’re probably not as large

C. No, health disparities are unique to the U.S.

D. No, income and wealth inequalities are unique to the U.S.
Who tends to have worsened health in a hierarchy? The leaders at the top or the followers down below?

A. The leaders because they get no exercise
B. The leaders because they get stressed out
C. The followers because they get stressed out
D. The followers because they started with poor health
Question 4.3

Is it good or bad to be *in utero* during a great cataclysm like a famine?

A. Good. You’re just a fetus and don’t have to “eat”

B. Good. There will be fewer surviving fetuses with whom to compete

C. Good. Whatever doesn’t kill you makes you stronger

D. Bad. Your mother’s body might make you a fat infant

E. Bad. Your body might adapt to a starvation diet
The Grossman Model

• Health is kind of like a bank account
  - You have an opening balance that might be larger or smaller depending on who you are
  - Over time and through life, the balance depends on
    - Withdrawals
    - Deposits
    - The rate of return
Before we dive in

• The Grossman (1972) model is *just a model*
  - It gives us a common baseline
  - It emphasizes certain truths
  - But it leaves out a lot of things that we think matter

• Economists think that models are useful even when we know they leave things out

• (And even though this model is “simple,” it’s also pretty complicated! We’ll talk about where the insights lie)
Health is a form of “capital”

- The word “capital” means a lot of things

- In economics, capital usually means either:
  - Physical factors of production like equipment and buildings
  - The value of those factors, which can be dollars
  - A related concept, like human capital (education) or here, health capital

- Important characteristic: Capital takes time to create, and once created, it tends to last
Why study health as capital?

- Some things about health are short-term in nature
- But a lot of other things are long-term
- The textbook pitches:
  - It helps us understand the relationship between socioeconomic status (education) and health
  - It also helps us understand declining health among aging individuals
Some key insights about the nature of health

1. Health makes us happier in everything we do

(“Health is a consumption good”)

2. Health keeps us alive and makes our time healthy; healthy time can be enjoyed or traded for earnings

(“Health is an input into production”)

3. Better health today also means better health tomorrow

(“Health is a form of capital”)
How do people choose levels of health?

• We know we can spend lots of time and money on being healthy

• But the more time and money we spend on health, the less we have for other enjoyments

• And other enjoyments of life are pretty fun!

• So far, this is the usual story of economic choice

• But a twist is that we need health to enjoy anything
One graph helps us the most

Rate of return

Stock of health, H

- The more health you have, the better off you are
- But the returns to additional health are diminishing:
  Healthy time rises strongly with health when sick, but slowly when already healthy
- Translation: The rate of return to holding health $H$ falls with $H$
One graph helps us the most

Rate of return

\[ r + \gamma \]

\[ \text{Stock of health, } H \]

- Rational people choose only so much H so that its return equals what they could get doing other things.
- Suppose that alternate rate of return is \( r \).
- Because H depreciates at rate \( \gamma \) the individual must receive from H at least \( r + \gamma \).
One graph helps us the most

- In economics, the equilibrium is always where the two curves cross.
- Here, that occurs at \( H^* \), the optimal stock of health at which the individual can't earn higher returns by shifting resources.

\[
\text{Rate of return} \quad r + \gamma
\]

\[\text{Stock of health, } H\]
Health inequalities. Suppose some individuals were more efficient at producing health.

One way of visualizing this is that a more efficient producer of health can reach a higher $H$ at a given cost and thus return.

The MEC curve shifts outward.

This raises equilibrium health capital to $H'$ because it's a better deal to the individual.
Health inequalities. Suppose health depreciated more quickly

- Imagine somebody for whom health depreciated more rapidly
- It would make sense to invest less in health; higher returns can be obtained elsewhere
- The opportunity cost of capital rises from $r + \gamma$ to $r + \gamma'$ and lower $H$ to $H''$

Rate of return

Stock of health, $H$

$H''$ $H^*$
There are educational gradients in lots of things; Here, HDL cholesterol, protective against heart disease
Historically, disparities since the late Enlightenment
A persistent wealth gradient in health, with changes in wealth that track earlier health status.

<table>
<thead>
<tr>
<th>1984 health status</th>
<th>1984 wealth</th>
<th>1994 wealth</th>
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<tbody>
<tr>
<td>Excellent</td>
<td>$68,300</td>
<td>$127,900</td>
</tr>
<tr>
<td>Very Good</td>
<td>$66,300</td>
<td>$90,900</td>
</tr>
<tr>
<td>Good</td>
<td>$51,800</td>
<td>$64,900</td>
</tr>
<tr>
<td>Fair or Poor</td>
<td>$39,200</td>
<td>$34,700</td>
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Hypotheses

- Efficient producer hypothesis
  - Those with more education might be more efficient producers of health
  - Adhering to treatment regimens isn’t easy
  - Doctors can’t know everything, not at doctors are equally skilled, and patients can play a big role
  - Goldman and Smith (2002) explore an intervention to promote diabetes treatment adherence

- It benefited all groups, but helped the less-educated more
• “Thrifty phenotype” or Barker hypothesis
  
  - Deprivation in very early life (in utero) may cause particular genes to activate
  
  - Thrifty genes may be good at managing deprivation, but they might be bad at operating during good times
  
  - Children in utero during famines, influenza, maybe even fasting, appear to suffer worsened adult health
  
  - (As we will discuss later, parents who have kids during such times might be different than those who don’t)
• Direct income hypothesis
  - More cash helps you buy better stuff. Lottery winners appear to have reduced mortality (Lindahl, 2005)

• Allostatic load hypothesis
  - Stress response in humans was useful in life-or-death preindustrial circumstances
  - Now, stress response just erodes health by producing stress hormones by weakening the immune system and aging the brain
  - British civil servants appear to suffer worse health outcomes when they have lower rank
• Productive time hypothesis

  - More a story of health causing socioeconomic status than the reverse

  - Several studies suggest that health disadvantages early in life lead to reduced working and poor health

• Time preferences and the Fuchs hypothesis

  - A story of a third variable that causes health and SES

  - Ability to resist temptation (the marshmallow experiment) in childhood is associated with better test scores in adolescence

  - But controlling for time preferences does not remove the SES gradient in health!
Does x or z cause y?

• Suppose there are two interventions that are themselves correlated

  \[ x = \text{education} \]
  \[ z = \text{belonging to a peer group} \]

  \[ y = \text{smoking, a function of these plus an error } \varepsilon \]
  \[ y = f(x,z,\varepsilon) = a + b \times + c \times z + \varepsilon \]

• How would we know whether it’s x or z that is causing y?