

Midterm Exam - Answer All Questions

PLEASE USE ONLY YOUR MIT ID ON BLUEBOOKS – NO NAMES
Q's 1,2 in one bluebook, Q's 3,4 in a second bluebook

This is a reasonably long exam so read it through so you can allocate your time effectively.

1) (15 points) On the eve of the British Industrial Revolution, most textiles were made by weavers working with hand-powered looms in their homes. The techniques they used took some time to learn and typically were passed from one generation to the next.

One aspect of the Industrial Revolution was the shifting textile production from home looms to machines in factories. From the 1790s to the 1830s, more than 100,000 power looms with 9,330,000 spindles were put into service in England and Scotland. These looms were tended people who had previously worked as farm laborers.

Compare and contrast the labor market impacts of these power looms to the labor market impact of computers as discussed in the readings and in class.

2) (25 points) Over time, several different researchers have done versions of the following analysis:

- The analysis begins by classifying jobs in today's economy – e.g. auto mechanic, lawyer, secretary, etc. – by the amount of education the job requires.
- The analysis then presents projections by the U.S. Bureau of Labor Statistics that show that the proportions of the work force who will be lawyers, auto mechanics, secretaries, etc. 20 years into the future will not be radically different from those proportions in today's work force.
- The analysis then concludes that projected shift in demand for more college graduates is wrong and that policies to encourage college attendance risk creating "The Overeducated American" all over again.

a) (15 points) Assuming the Bureau of Labor Statistics projections are **correct**, explain why you think this analysis is or is not a reasonable basis for making educational policy. If possible, choose a specific occupation and use it to illustrate your answer.

b) (10 points) Considering how economists usually determine the existence of demand shifts, explain what kinds of basic economic data you could collect to see if the researchers' analysis is turning out to be correct.

3) (30 points) In most of our class discussions, we implicitly or explicitly model an individual's career as having two separate periods:

- A first period – schooling - in which the individual acquires education full time. During this period, we assume they do little or no work for pay. For most people, this period ends sometime between the ages of 17 and their mid-20's.
- A second period – a work history - in which the individual works fulltime in a sequence of jobs. This period begins when the individual's education ends and it lasts until they retire - say, at age 65. During this period, we assume they acquire no fulltime education.

a) (10 points) In the standard human capital model of educational attainment, why does this two-period model make sense? That is, why should a person want to finish all their education before they start to work?

b) (15 points) In real life, of course, some people who have worked full time can go back to get additional education - for example, starting junior college or college in their late 20's or early 30's. Should we expect that the fraction of young people choosing this option should have been higher in the 1980s or the 1990s? Explain.

c) (5 points) Explain how did labor market conditions from the late 1970s through the 1980s violated a basic assumption of the standard human capital model.

4) (30 points) It is 1995 and you are education advisor to the governor of Massachusetts. You have just been given a regression that was done by your predecessor in the job who was assessing the effectiveness of high school teachers having a Masters Degree. The regression is based data collected from a random sample of schools in the state. Unfortunately, your predecessor left before the research was finished. The governor has called you into her office to explain what the regression says.

What appears below is part of the estimated regression:

$$\text{Test Score}_{\text{JUNE } I,J} = 3.63 - 2.89 * \text{MA}_I + (\text{other variables})$$

$$(1..01) \quad (-.93)$$

(figures in parentheses are the standard errors of the coefficients)

Where: $\text{Test Score}_{\text{JUNE } I, J}$ is the June Standardized Test Score of Student I in High School Subject J (i.e. math, history, English, etc.)

$MA_I = 1$ if the teacher of Student I in High School Subject J has a Masters Degree in at least one subject.

$= 0$ if the teacher or Student I in High School Subject J has no Masters Degree (or PhD) in any subject.

a) (10 points). According to the regression, does having a Masters Degree have a statistically significant effect on a student's achievement test score? Explain how you know. If you believe the regression is correct, what policy implications do you draw?

b) (10 points) Describe, as completely as you can, why the estimated regression might not be correct and so should not be used for policy.

c) (10 points) Assume the governor throws the current study out and asks you to determine whether having a Masters Degree increases student performance. Briefly explain how you would approach the problem. You are free to generate new data if you think it is relevant.
