LABOR ECONOMICS (EE 471)

☺☺ Optional practice questions ☺☺

Chapter 7

1. Consider an economy with the following income distribution: each person in the bottom quartile of the income distribution earns $15,000; each person in the middle two quartiles earns $40,000; and each person in the top quartile of the income distribution earns $100,000.

(a) What is the Gini coefficient associated with this income distribution?
(b) Suppose the bottom quartile pays no taxes, the middle two quartiles pay 10 percent of its income in taxes, and the top quartile pays 28 percent of its income in taxes. Two-thirds of all tax money is redistributed equally to all citizens in the form of military defense, government pensions (social security), roads/highways, etc. The remaining one-third of tax money is disturbed entirely to the poorest quartile. What is the Gini coefficient associated with this redistribution plan? Would you consider this tax and redistribution plan to be a particularly aggressive income redistribution policy?

2. Ms. Aura is a psychic. The demand for her services is given by Q = 2,000 – 10P, where Q is the number of one-hour sessions per year and P is the price of each session. Her marginal revenue is MR = 200 – 0.2Q. Ms. Aura's operation has no fixed costs, but she incurs a cost of $150 per session (going to the client's house).

(a) What is Ms. Aura's yearly profit?
(b) Suppose Ms. Aura becomes famous after appearing on the Psychic Network. The new demand for her services is $Q = 2500 – 5P$. Her new marginal revenue is MR = 500 – 0.4Q. What is her profit now?
(c) Advances in telecommunications and information technology revolutionize the way Ms. Aura does business. She begins to use the Internet to find all relevant information about clients and meets many clients through teleconferencing. The new technology introduces an annual fixed cost of $1,000, but the marginal cost is only $20 per session. What is Ms. Aura's profit? Assume the demand curve is still given by $Q = 2500 – 5P$.

3. Consider two developing countries. Country A, though quite poor, uses government resources and international aid to provide public access to quality education. Country B, though also quite poor, is unable to provide quality education for institutional reasons. The distribution of innate ability is identical in the two countries.

(a) Which country is likely to have a more positively skewed income distribution? Why? Plot the hypothetical income distributions for both countries on the same graph.
(b) Which country is more likely to develop faster? Why? Plot the hypothetical income distributions in 20 years for both countries on the same graph.

4. File sharing software threatens the music industry in part because artists will not be fully compensating for their recording of songs. Suppose that the government decides that file sharing software products are legal anyway.

(a) The almost immediate result will be that artists start earning very little money for their recordings but they continue to earn money for live performances. How will income change for the music industry? How does your answer relate to the superstar phenomenon?

(b) Although one would expect lower prices to benefit the music-listening public if the government decides that file sharing software products are legal, but in what way(s) could the music-listening public also be hurt from the policy?

Chapter 8

1. Suppose high-wage workers are more likely than low-wage workers to move to a new state for a better job.

(a) Explain how this migration pattern can be due solely to differences in the distribution of wages.
(b) Explain how this migration pattern can take place even if the cost to moving is greater for high-wage workers.

2. Mickey and Minnie live in Orlando. Mickey's net present value of lifetime earnings in Orlando is $125,000, while Minnie's is $500,000. The cost of moving to Atlanta is $25,000 per person. In Atlanta, Mickey's net present value of lifetime earnings would be $155,000, while Minnie's would be $510,000. If Mickey and Minnie choose where to live based on their joint well-being, will they move to Atlanta? Is Mickey a tied-mover or a tied-stayer or neither? Is Minnie a tied-mover or a tied-stayer or neither?

3. Suppose the immigrant flow from Lowland to Highland is positively selected. In order to mitigate the "brain drain" Lowland experiences as a result of this migration, public officials of Lowland successfully convince all Lowlanders who migrate to Highland to remit 10 percent of their wages to family members.

(a) What effect will this policy have on the immigrant flow?
(b) Provide a graph that details the extent to which this policy will limit the brain drain.

4. The Immigration Reform Act of 2006 provided fewer work visas than were available in previous years for college graduates to remain in the United States. The exception is that work visas remained plentiful for college graduates who majored in technical areas such as math, computer programming, and physics.

(a) How will this policy likely affect the skill distribution of immigrants to the United States and the age-earnings profile of immigrants in the United States?
(b) In the future a demographer uses the 2010 U.S. census to study immigrant wages and concludes that the U.S. policy actually had the unintended consequence of attracting immigrants with lower levels of productivity as shown by a flatter age-earnings profile. Using a graph similar to Figure 8-5, show why the demographer's conclusions are sensitive to cohort effects.

Answers
Chapter 7

1. Consider an economy with the following income distribution: each person in the bottom quartile of the income distribution earns $15,000; each person in the middle two quartiles earns $40,000; and each person in the top quartile of the income distribution earns $100,000.

(a) What is the Gini coefficient associated with this income distribution?

For practice one might draw the actual Lorenz curve, but this problem is fairly easy as the actual Lorenz curve will be a straight line *within income groups*.

If there are 1,000 people in the economy: the bottom quartile contributes 250 x 15,000 = $3.75 million toward total national income; the middle two quartiles contribute 500 x 40,000 = $20 million; and the top quartile contributes 250 x $100,000 = 25 million. Thus, total national income is $48.75 million, with the lowest quartile receiving about 7.7% of income, the middle quartiles receiving 41.0%, and the top quartile receiving 51.3%. The area under each of these three sections of the actual Lorenz curve, therefore, is (where a ½ indicates a triangle while 0.25 indicates a quartile and 0.50 indicates the middle two quartiles):

- Lowest quartile: (½)(0.25)(0.077) = 0.009625.
- Middle two quartiles: (0.5)(0.077) + (½)(0.5)(0.41) = 0.141.
- Top quartile: (0.25)(0.487) + (½)(0.25)(0.513) = 0.185875.

Thus, the Gini coefficient is (0.5 – 0.009625 – 0.141 – 0.185875) / 0.5 = 0.327.

(b) Suppose the bottom quartile pays no taxes, the middle two quartiles pay 10 percent of its income in taxes, and the top quartile pays 28 percent of its income in taxes. Two-thirds of all tax money is redistributed equally to all citizens in the form of military defense, government pensions (social security), roads/highways, etc. The remaining one-third of tax money is disturbed entirely to the poorest quartile. What is the Gini coefficient associated with this redistribution plan? Would you consider this tax and redistribution plan to be a particularly aggressive income redistribution policy?

First, we must determine total taxes: 500(40,000)(0.10) + 250(100,000)(0.28) = $ 9 million are paid in total taxes. This comes from each person in the lowest quartile paying $0; each person in the middle two quartiles paying $4,000 in taxes; and each person in the top quartile paying $28,000 in taxes. Of this $9 million, $6 million is repaid to all people equally in the form of defense, social security, road, etc. So, each person claims $6,000 of this pool of taxes. The remaining one-third of taxes, which equals $3 million, is divided among the poorest quartile. Thus, the poorest 250 people each receive an income transfer of $12,000. New incomes, therefore, are $33,000 for the bottom quartile, $42,000 for the middle two quartiles, and $78,000 for the top quartile. Given these new numbers, the analysis from part (a) can be repeated.

The bottom quartile receives $8.25 million of income, or 16.9% of $48.75 million.
The middle two quartiles receive $21 million of income, or 43.1% of $48.75 million.
The top quartile receives $19.5 million of income, or 40.0% of $48.75 million.
And the Gini coefficient is 0.173245.

This appears to be a fairly substantial redistribution scheme as it cuts the Gini coefficient in half. It also has the richest person earning 2.36 times that of the poorest person (78/33) whereas this ratio was 6⅔ times (100/15) without the redistribution.

2. Ms. Aura is a psychic. The demand for her services is given by $Q = 2{,}000 - 10P$, where Q is the number of one-hour sessions per year and P is the price of each session. Her marginal revenue is $MR = 200 - 0.2Q$. Ms. Aura's operation has no fixed costs, but she incurs a cost of $150 per session (going to the client's house).

(a) What is Ms. Aura's yearly profit?

Find the number of sessions that Ms. Aura will provide by equating the marginal revenue to the marginal cost of a session:

$$MR = MC$$
$$200 - 0.2Q = 150$$
$$0.2Q = 50$$
$$Q^* = 250$$

The price that would generate demand for 250 sessions is $175. Thus, her annual profit is 175(250) – 150(250) = $6,250 per year.

(b) Suppose Ms. Aura becomes famous after appearing on the Psychic Network. The new demand for her services is $Q = 2500 - 5P$. Her new marginal revenue is $MR = 500 - 0.4Q$. What is her profit now?

The same kind of calculations as in part (a) but using the new demand curve yields a profit maximizing quantity of 875 sessions at a price of $325 per session and an annual profit of $153,125.

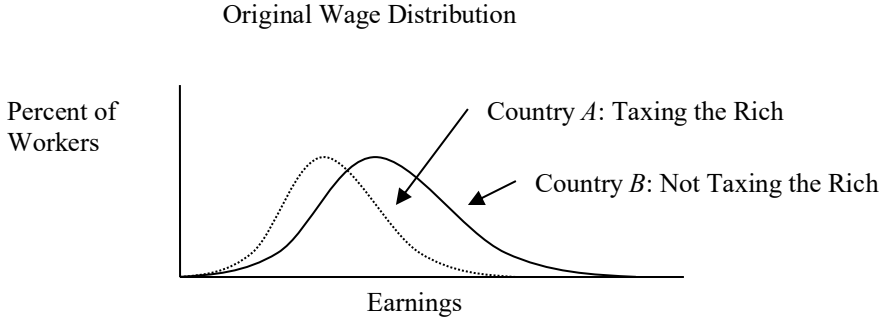
(c) Advances in telecommunications and information technology revolutionize the way Ms. Aura does business. She begins to use the Internet to find all relevant information about clients and meets many clients through teleconferencing. The new technology introduces an annual fixed cost of $1,000, but the marginal cost is only $20 per session. What is Ms. Aura's profit? Assume the demand curve is still given by $Q = 2500 - 5P$.

With the new marginal cost, Ms. Aura will provide 1,200 sessions and charge $260 per session. Her annual profit will equal $287,000.

3. Consider two developing countries. Country A, though quite poor, uses government resources and international aid to provide public access to quality education. Country B, though also quite poor, is unable to provide quality education for institutional reasons. The distribution of innate ability is identical in the two countries.

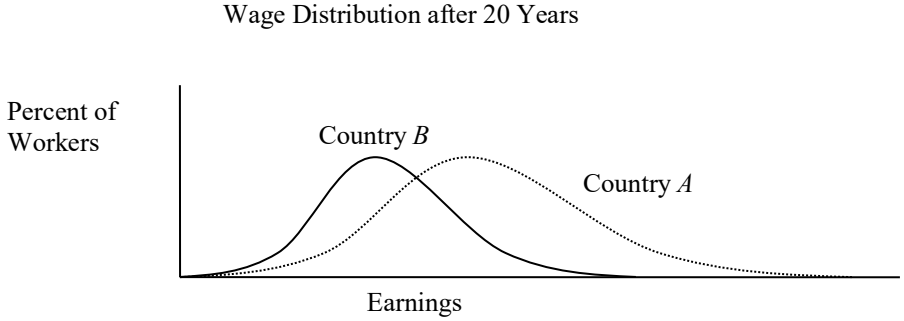
(a) Which country is likely to have a more positively skewed income distribution? Why? Plot the hypothetical income distributions for both countries on the same graph.

At the outset, there is no reason to think the distribution of income is different between the two countries. However, one could argue that Country *A* collects more taxes than Country *B*, and as taxes are likely to fall more heavily on the rich, that the simple act of collecting taxes in Country *A* will cause it to lessen the skewness in its income distribution relative to Country *B*. Of course, one could make the alternative argument – that developing countries over-tax their poorest workers more than the rich. The graph below, however, assumes the first case.



(b) Which country is more likely to develop faster? Why? Plot the hypothetical income distributions in 20 years for both countries on the same graph.

Country *A* is likely to develop faster because of its savings and investments into education (human capital).



4. File sharing software threatens the music industry in part because artists will not be fully compensating for their recording of songs. Suppose that the government decides that file sharing software products are legal anyway.

(a) The almost immediate result will be that artists start earning very little money for their recordings but they continue to earn money for live performances. How will income change for the music industry? How does your answer relate to the superstar phenomenon?

Musicians who are also great performers will continue to make new music and will continue to earn a lot of money. Musicians who are good at making new music but not good at giving live performances will see a reduction in their income. For example, rumor has it that Steely Dan and the Steve Miller Band are fairly horrible in concert, although their music is loved by many people. These bands would struggle to earn money under the policy. Other artists that are known to put on great shows (The Rolling Stones) will continue to earn a lot of money. Thus, the public policy doesn't choose which superstars will continue to do well; it simply redefines what talents are going to be rewarded.

(b) Although one would expect lower prices to benefit the music-listening public if the government decides that file sharing software products are legal, but in what way(s) could the music-listening public also be hurt from the policy?

The most obvious way such a policy would hard the music-listening public is that fewer people make music as it is less profitable. Thus, the public will have fewer choices of music to listen to. This is analogous to if the government removed the patent system from new drugs, which would results in fewer new drugs being developed.

Chapter 8

1. **Suppose high-wage workers are more likely than low-wage workers to move to a new state for a better job.**

(a) Explain how this migration pattern can be due solely to differences in the distribution of wages.

Suppose migration costs are the same for all workers at $3,000. Then, if all low-wage workers are paid either $20,000 or $22,000 depending on productivity and location, and that all high-wage workers are paid either $40,000 or $45,000 depending on productivity and location. The immediate result is that no low-wage worker will ever migrate, while all high-wage workers who are not already earning $45,000 will migrate to a location where they are valued at $45,000.

(b) Explain how this migration pattern can take place even if the cost to moving is greater for high-wage workers.

What matters is the difference in wages due to migration and the cost of migration. So, for example, in the previous example, even if the cost to migration was $4,000 for high wage workers while it remained at $3,000 for low-wage workers, the same pattern of no low-wage workers migrating and all high-wage workers migrating until they earn $45,000 emerges.

2. Mickey and Minnie live in Orlando. Mickey's net present value of lifetime earnings in Orlando is $125,000, while Minnie's is $500,000. The cost of moving to Atlanta is $25,000 *per person*. In Atlanta, Mickey's net present value of lifetime earnings would be $155,000, while Minnie's would be $510,000. If Mickey and Minnie choose where to live based on their joint well-being, will they move to Atlanta? Is Mickey a tied-mover or a tied-stayer or neither? Is Minnie a tied-mover or a tied-stayer or neither?

As a couple, the net present value of lifetime earnings of staying in Orlando is $500,000 + $125,000 = $625,000 and of moving to Atlanta is $510,000 + $155,000 – $50,000 = $615,000. Thus, as a couple, they would choose to stay in Orlando, and there can be at most one tied-stayer. (There cannot be a tied-mover, because the couple is not moving.)

For Mickey, staying in Orlando is associated with a net present value of $125,000, while moving to Atlanta would yield a net present value of $155,000 – $25,000 = $130,000. So Mickey would choose to move to Atlanta. Therefore, Mickey is a tied-stayer.

For Minnie, staying in Orlando is associated with a net present value of $500,000, while moving to Atlanta would yield a net present value of $510,000 –$25,000 = $485,000. So Minnie would choose to remain in Orlando. Thus, Minnie is not a tied-stayer.

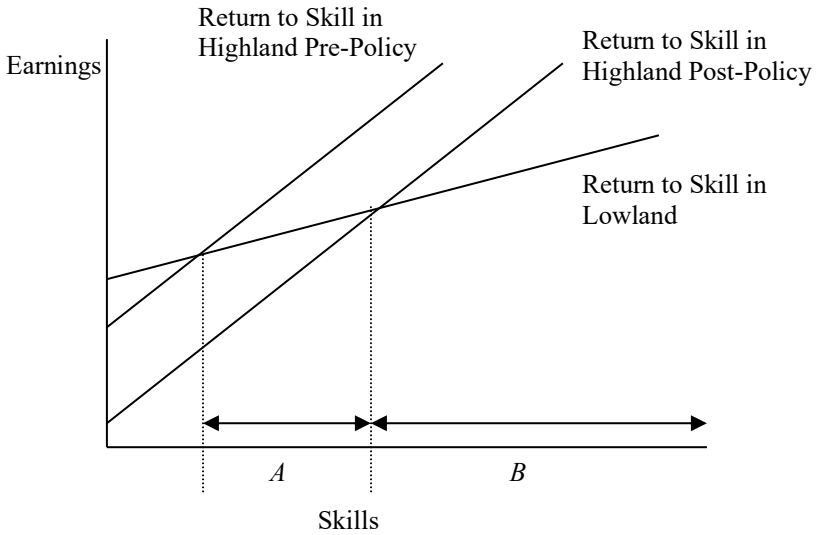
3. Suppose the immigrant flow from Lowland to Highland is positively selected. In order to mitigate the "brain drain" Lowland experiences as a result of this migration, public officials of Lowland successfully convince all Lowlanders who migrate to Highland to remit 10 percent of their wages to family members.

(a) What effect will this policy have on the immigrant flow?

The policy, in essence, increases the cost of migration. In particular, the policy convinces everyone who is thinking about immigrating that their wage in Highland will be 90% of what it actually is because immigrants "must" remit 10% of their earnings.

(b) Provide a graph that details the extent to which this policy will limit the brain drain.

The implication is that fewer people will immigrate from Lowland to Highland, with the action taking place on the margin (section *A* in the graph below). Thus, the policy limits the brain drain partially as some high skill people who otherwise would have immigrated no longer do. However, the policy will not prevent the most skilled people from still immigrating. Thus, Lowland still experiences brain drain of its best people.



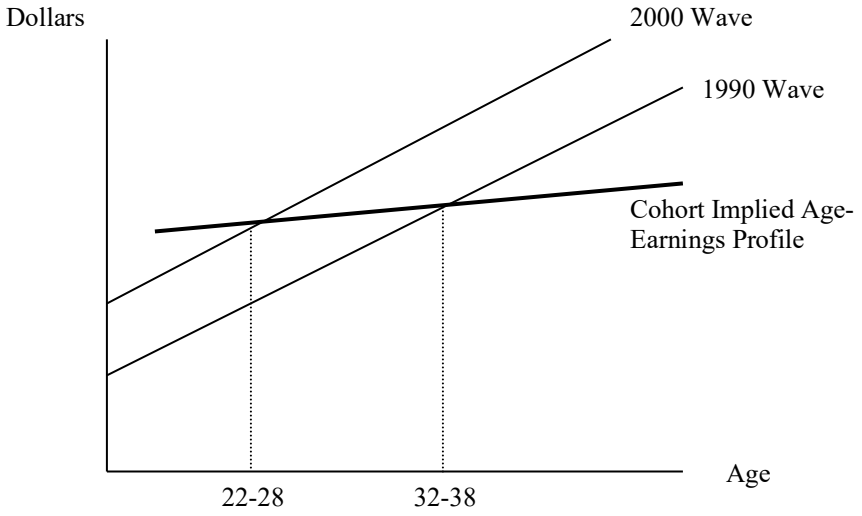
In the graph above, Lowlanders with skills in *A* or *B* immigrate to Highland. After the policy, those in *B* still immigrate, but those in *A* no longer do.

4. The Immigration Reform Act of 2006 provided fewer work visas than were available in previous years for college graduates to remain in the United States. The exception is that work visas remained plentiful for college graduates who majored in technical areas such as math, computer programming, and physics.

(a) How will this policy likely affect the skill distribution of immigrants to the United States and the age-earnings profile of immigrants in the United States?

The policy favors high-tech college majors, not so much in terms of attracting them to the United States but rather in terms of allowing them to stay once they were educated here. Thus, the policy will likely allow more high-tech (high-skill) immigrants to stay in the U.S. while requiring others to leave the U.S. after college. Measured in terms of wages, therefore, the policy will likely result in a greater positive skill-selection and result in a higher age-earnings profile of new immigrants. The profile for the year 2000 cohort may be steeper as well, but that is not so clear.

(b) In the future a demographer uses the 2010 U.S. census to study immigrant wages and concludes that the U.S. policy actually had the unintended consequence of attracting immigrants with lower levels of productivity as shown by a flatter age-earnings profile. Using a graph similar to Figure 8-5, show why the demographer's conclusions are sensitive to cohort effects.



In 2010 when using cohort analysis, the age-earnings profile will appear to be flatter than during similar previous studies. This is because the average wage of 20-something immigrants presently will be higher than it would have been without the policy and therefore the profile between 20-somethings and 30-somethings will appear to be less steep. Put differently, because of the higher earnings of the younger cohort, the age-earnings profile implied by the 1990 and 2000 cohorts appears to be very flat.