Department of Urban Studies and Planning 11.128/11.248 February 26, 2002
Department of Economics 14.49

Problem Set 2
Due in Class, March 12

1) We have discussed several different definitions of skill in class. One definition we didn't explicitly discuss is the following:

"The more years of training an occupation requires, the more skilled it is."

As we saw in class, an occupation that is skilled under one definition may not be skilled under another. Begin with at least three definitions of skill, including the one above. Choose three different occupations that score high on the length-of- training-time-definition above but score low on at least one of your two other definitions. In each case, explain why these differences in score occur.

2) In an automobile repair shop, technicians carry various grades based on their experience and training. "A" technicians are those who are given the most difficult problems. There are also "B" technicians, "C" technicians who are limited to routine work like tune-ups and the lowest grade, - "Lube Boys" – who perform lubrication and oil changes and little else. Hourly pay varies by grade with a good "A" technician earning $70,000 or more a year while Lube Boys are paid $7 - $10.00 per hour. The shop management wants to minimize costs and so hires the lowest cost mix of technicians needed to deal with the mix of problems it gets.

Over the last 20 years, there has been a sharp increase in both the number of electronic components in cars and the sophistication of computerized testing equipment to diagnose problems. Sketch a model that allows you to describe how the introduction of computerized testing equipment might change the mix of technicians in an auto repair shop.

3) In a typical auto showroom, salesmen have no permanent desks. Rather, they are assigned a desk during the hours they are working. Typically, a salesman at the beginning of his shift will put a picture of young children on his desk (sometimes posed with an adult woman). The picture is set in a way that a customer sitting in front of the desk can see it.

a) What is the purpose of this picture? What role do patterns/schema have in achieving this purpose?

b) Different customers will bring different contexts to the visual information in the picture and so will construct different meaning from it. Give at least three different interpretations someone might put the information in the picture.

4) A supermarket has a number of occupations including these three: check-out clerk, manager of the fresh produce department, and butcher. For each occupation, list what you believe to be its main tasks. For each task, briefly explain whether a rules-based program can replace the task, complement the task, or have no effect on the task.

5) Consider the simple model of general vs. specific skills that we saw in recitation. In particular, there are

- two types of tasks (jobs), A and B;
- two types of skills, S and G;
- two periods, today and tomorrow.

Skill investments are made by workers today for use today and tomorrow. It costs 1 unit to obtain skill S and c units to obtain skill G, where $c>1$.. Workers with skill S or G are equally productive at Task A, and can obtain a wage w^A. However, only workers with skill G can perform task B, for which they earn a wage of $w_G^B \leq w^A$. Of course, $w_S^B=0$. There is a positive probability p that (for some exogenous reason) there is no demand tomorrow for task A. (That is, type A jobs may simply be replaced by computers). The interest rate is r.

1. Write down the expected lifetime income (in NPV terms) of a worker who invests in skill S.
2. Write down the expected lifetime income (in NPV terms) of a worker who invests in skill G.
3. Assuming risk neutrality (so that what matters is expected value only), characterize the worker's skill-investment decision.
4. How does an increase in p affect the worker's decision? Interpret.
5. How does an increase in c affect the worker's decision? Interpret.
6. How does an increase in r affect the worker's decision? Interpret.
7. Now suppose that individual vary in their ability to acquire general skills G. (That is, there is heterogeneity in c.) How will an increase in p affect the income gap between more- and less-able workers? Interpret.
8. In light of 5.7, discuss the following statement: "All technological change is skill-biased." Link your analysis to the model and to several "real world" examples, including but not limited to the empirical results of Schultz regarding "green revolution" crops.