ECON 381 Final Exam Answer Key

Prof. Krauth, Spring 2012

True, false or uncertain (5 points each, 40 points total)

1. False. The main problem with this approach is that recent immigrant cohorts have had a larger "entry effect", i.e., they earned less at entry relative to the native-born than earlier cohorts did. This entry effect will bias the results in favor of finding convergence since the gap between the current earnings of early cohorts and entry earnings of new cohorts (the thing we are measuring) is larger than the gap between the current and entry earnings of early cohorts (the thing we are trying to measure).
2. True. There's not much else to say here, so we'll give credit to any reasonable explanation as long as you said "True".
3. False. Since the public sector must have workers, competition in the labour market implies they must pay at least as much as the private sector. Private sector competition thus puts a floor on public sector wages, though it does not put a ceiling (public sector employers can pay *more* than the private sector, since they have no competition in the product market forcing them to minimize costs).
4. False. There are many alternative explanations: efficiency wages, unionization and/or monopoly rents, etc.
5. False. This finding is consistent with both hypotheses (that is, it doesn't disprove them) but it does not prove either.
6. Uncertain. It depends on whether foreign and domestic workers are substitutes or complements in production.
7. False or uncertain. An increase in the wage implies both an income effect and a substitution effect. The substitution effect implies that hours will go up when wages go up. When leisure is a normal good, the income effect implies that hours will go down when wages go up. The overall effect of wages on hours depends on whether the income or substitution effect is stronger. In most cases, the substitution effect is stronger, and so labour supply curves slope up.
8. True. In order to reduce the implicit tax rate on labour income, it is necessary to phase out benefits very gradually. The result of this is that benefits are received by people whose income is significantly higher.

Problems (60 points total)

1. **20 points**
    a. The marginal revenue product of one hour of labour is \$10, and the marginal cost of one hour of labour is

$$MC = \frac{d}{dL} wL = \frac{d}{dL}(5 + 0.025L)L = 5 + 0.05L$$

Bob's profits are maximized when MC=MR, or when 5+0.05L=10. Solving for L we get:

$$L = \frac{10 - 5}{0.05}$$
$$= 100$$

This means that the wage is:

$$w = 5 + 0.025 * 100$$
$$= \$7.50$$

and profits are:

$$\pi = 10L - wL$$
$$= 10 * 100 - 7.50 * 100$$
$$= 250$$

b. It will reduce employment.
c. It will increase employment.
d. We can calculate the town's aggregate labour supply curve by first solving both curves for quantity supplied:

$$L_m = \frac{w - 6}{0.05}$$
$$L_f = \frac{w - 4}{0.05}$$

Then we add the two curves together:

$$L = L_m + L_f = \frac{2w - 10}{0.05} = 40w - 200$$

This would be an acceptable answer, but it is more convenient to solve in terms of w:

$$w = 5 + 0.025L$$

Note that this is the same aggregate labour supply curve as we were using before.

e. Note that the answer to (d) is the same labour supply curve used for (a), so we can re-use our answers from (a): the wage will be w = \$7.50, and profits will be π = \$250. To find labour supply we simply substitute into the curves above, and we find that male labour supply will be L_m = 30, and female labour supply will be L_f = 70,.
f. We follow the same procedure as in (a) but with the two gender-specific labour supply curves. This yields w_m = \$8, w_f = \$7, L_m = 40, L_f = 60, π = \$260.

g. Yes, Bob makes $10 more in profits when he discriminates.
h. In the long run, workers will move to other towns in pursuit of higher wages. This will reduce Bob's labour supply, so he will need to pay higher wages. Because moving is costly, human capital theory predicts it will be done by younger workers (who can balance the fixed cost of moving with more years of increased wages). As a result, wages will go up, employment and population will go down, and the average age in the town will go up.

2. **20 points**
   a. This could be explained by "Canada-specific" human capital, including knowledge of English, knowledge of Canadian business practices, and local social connections. Immigrants earn much less on entry due to their lack of Canada-specific human capital, but there is an associated advantage: because their Canada-specific human capital starts out low, it can be accumulated much more quickly than for the native-born.
   b. This requires a model human capital that is acquired in part by job experience.
   c. This can be accounted for by a model with efficiency wages, with unionization and monopoly rents, with firm-specific human capital, or with hiring costs.
   d. This can be accounted for by quasi-fixed costs, i.e., costs such as insurance benefits that vary with the number of workers regardless of how many hours they each work. Firms with quasi-fixed costs will prefer to hire few workers for many hours.
   e. This can be accounted for by hiring costs. Firms facing a fixed cost of hiring workers will pay those workers less than their expected marginal revenue product. This will produce a "buffer" between the worker's wage and marginal revenue product, so the firm will still find it optimal to keep the worker even if his or her marginal revenue product falls a bit.
   f. Ordinarily, noncash benefits will be less valuable than the equivalent amount of cash. So in order to do this either the firm must be able to obtain the benefit at lower cost (e.g., the firm can obtain insurance more cheaply because it avoids adverse selection problems), the benefit must be required by law, or the benefit must satisfy some strategic goal of the firm (e.g. deferred compensation to reduce worker turnover).

3. **20 points**
   a. High-skill workers will obtain a university degree if

$$\frac{w_0}{r} \leq \frac{w_H}{r} - C = \frac{w_0 + p_H - aN}{r} - C$$

   Substituting in and solving for *N*, we find that high-skill workers will obtain a university degree if:

$$N \leq \frac{p_H - rC}{a} = \frac{30{,}000 - 0.1 * 50{,}000}{35{,}000} = 0.714$$

b. By the same calculation, low-skill workers will obtain a university degree if:

$$N \leq \frac{p_L - rC}{a} = \frac{20{,}000 - 0.1 * 50{,}000}{35{,}000} = 0.429$$

c. In equilibrium we will have $N_H = 1$, $N_L = 0$, and $N = 0.5$.
d. Since poor young workers cannot borrow, they will not obtain a university degree: $N_{PH} = N_{PL} = 0$. All rich high-ability workers will go to university $N_{RH} = 1$. However, because only half of the high-ability workers go to university (the rich ones), some of the rich low-ability workers will go to university until $N = 0.429$. This gives $0.429 = (1+0+0+N_{RL})/4$; solving for N_{RL} gives $N_{RL} = 0.716$.
e. With borrowing constraints we have:

$$APL = 30{,}000 + \frac{30{,}000 * 0.5}{2} + \frac{20{,}000 * 0.358}{2} - \frac{35{,}000}{2} 0.429^2$$
$$= \$37{,}859$$

Without borrowing constraints we have:

$$APL = 30{,}000 + \frac{30{,}000 * 1}{2} + \frac{20{,}000 * 0}{2} - \frac{35{,}000}{2} (0.5)^2$$
$$= \$40{,}625$$

f. Borrowing constraints both reduce total university participation and substitute rich low-ability students for poor high-ability students whose productivity would benefit more from university.
g. Not quite. Although in this model there is no correlation between parental income and ability, in the real world there may very well be such a correlation. As a result, there may be a positive correlation between parental income and university attendance even in the absence of borrowing constraints.
h. Yes, this is at least stronger evidence than in (g). When young people face borrowing constraints, a tuition increase will disproportionately reduce enrollments among low-income individuals.