

## TP N°4 - Capital humano

- 1 To obtain an empirical estimate of the average return to education, you collect data on the wages and schooling level of individuals. The data is used to estimate the econometric model:

$$w_i = \alpha_0 + \alpha_1 EDUC_i + \varepsilon_i$$

where  $w$  is the hourly wage rate and  $EDUC$  is years of schooling. Give one reason why  $\alpha_1$  is likely to overstate and one reason why it is likely to understate the 'true' return to education.

- 2 One possible method of testing between the human capital and signalling model of wage determination is to test for *diploma effects*. In other words, suppose you estimate the following model:

$$w_i = \alpha_0 + \alpha_1 CREDITS_i + \alpha_2 DIPLOMA_i + \varepsilon_i$$

where  $w$  is the wage,  $CREDITS$  is the number of college credits obtained by the individual, and  $DIPLOMA$  is a 0/1 dummy variable taking the value of one if the individual graduated from college. What do the human capital and signalling theories each predict about the signs and statistical significance of  $\alpha_1$  and  $\alpha_2$ ?

- 3 Consider an individual who lives for two periods. In the first period, the individual may either work or go to school (but not both). In the second period, the individual will work regardless of what was done in the first period. If the individual foregoes schooling and decides to work, she will earn \$200 in period 1 and \$250 in period 2. If she decides to get an education in the first period, her wage in period 2 will be \$575. The direct cost of schooling in period 1 is \$100.

- (a) If the individual's discount rate is 10%, will she work or go to school in the first period if her utility is a function of income only?
- (b) Calculate the internal rate of return.

- 4 Suppose that through the miracle of modern medicine, individuals now live three periods instead of only two. In the first two periods everything is the same as in the previous question. Specifically, individuals may either attend school (paying a direct cost of \$100) or work (and earn \$200) in period 1. Period 2 wages are \$250 without schooling, \$575 with schooling. Period 3 wages are the same as period 2 wages: \$275 without schooling, \$575 with schooling. Calculate the new internal rate of return. How does it compare to the internal rate of return from Question (1), when individuals only lived two periods? [Hint: Recall the quadratic formula. If  $ax^2 + bx + c = 0$ , then  $x = \left(-b \pm \sqrt{b^2 - 4ac}\right) / 2a$ .]