

Econ 333: Fall 2000.

Study Guide for Essay type questions for the final exam.

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In the following study guide, text in bold is the question, and the text in normal font is the suggested answer.

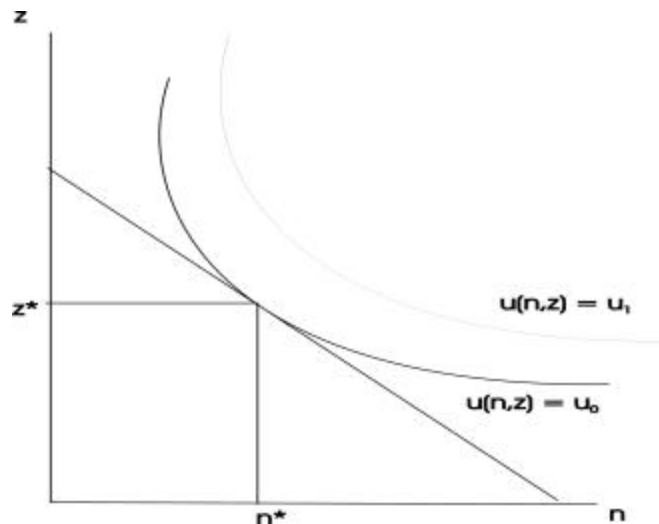
- 1. Briefly describe the pattern of demographic transition that most of the European countries went through in the past and the patterns that the less developed and newly industrialized countries experienced in the recent past.**

Read the appropriate part of the book.

- 2. Describe graphically the Malthusian population trap model of economic development and population growth.**

Read the appropriate part of the book.

- 3. Consider the utility maximization model of household fertility choice that we considered in the class. Suppose the utility function $u(n, z)$ of a household over the aggregate marketed good z and the desired number of surviving children n is given by $u(n, z)$. Suppose the price of the aggregate marketed good is $p_z = 1$ and the cost of a surviving child is p_n . Suppose the household has income I . Show graphically the budget set, indifference curve, and optimal choice of fertility level. Notice that for any factor that will affect fertility choice of the individual has to come through its effect on the child-cost p_n relative to the aggregate consumption good, or through its effect on household income I . Explain how the demand for children will be affected in each of the following cases, explicitly stating if the effect is through child cost, p_n , through household income I , or both.**
 - When mother gets higher education and thus have better chance of working and earning higher wages.
 - When government introduces mandatory schooling for all children.
 - When government prohibits employment of child labor.
 - Government spends more money on health so that infant mortality rate goes down. (Here distinguish between the actual number of children the parents will have to meet a desired number of children).
 - Government introduces social security program for all.



The components of child cost includes:

- 1) mother's time (child care costs, foregone income etc.)
 - 2) cost of pre-school, school - both direct and opportunity costs (child labor)
 - 3) cost of health care (preventing infant mortality, morbidity)
 - 4) cost of goods (food, diapers etc.) required in raising a child.
 - 5) future transfers from children to parents (old age security etc.)
- a) If mother's earnings go up, the opportunity cost (foregone wages) of raising a child increases. Since P_n increases, the household substitutes away from children. However, the increased earnings also causes an income effect because when the household income rises, the demand for children should increase if children are a normal good. The net effect depends on whether the substitution effect dominates the income effect, or vice versa. In the real world, we see that the substitution effect appears to dominate because mother's with higher wages tend to have fewer kids.
 - b) If the government introduces mandatory schooling for children, the child cost increases because the option to keep the kid at home or send the kid to work is no longer available. This reduces the demand for children.
 - c) If the government bans child labor, the child cost would increase just like in (b) because the option of sending kids to work (and thus lowering the child cost) is not available. This reduces the demand for children.
 - d) If the infant mortality rate goes down, the child cost would decrease because parents have to spend less to have the desired number of children. This would increase the demand for children. But there is another effect of infant mortality: when infant mortality is lower, the actual number of children that parents need to have in order to have the same desired number of children decreases (e.g. if there is no infant mortality, you have 1 child if you want 1 child, if it is 50%, you need to have 2 kids if you want 1 to live). This latter effect increases the demand for children. In the real world, we see that this effect dominates the cost effect.
 - e) If the government introduces a social security program for all, the lifetime cost (in terms of permanent income) of raising a child increases because the parents don't need to rely

on transfers from their children in old age. Therefore, the investment motive for having kids falls, and the child cost rises. This reduces the demand for children.

From parts (a)-(e), we have a coherent story of why fertility rates are high in developing countries. These countries are characterized by low wages and employment options for women, weak laws on compulsory schooling and child labor, large agricultural sectors, high infant mortality rates and weak or absent social security.

- 4. Recall what we mean by private/individual benefits and social benefits of education. The benefits that directly accrue to one who is engaged in acquiring education is his/her *private or individual benefits*. But if others also benefit from some one else's education, then such benefits are social or *public benefits of education*. The other beneficiaries could be members of the immediate family, could be the community or neighbors, or could be the whole society, or even the whole world.**

(a) What are the private or individual benefits of education? Explain each type of private benefits with suitable examples.

- Private benefit
 - 1) Learning for enjoyment, for the sake of acquiring knowledge and deriving happiness, may not give you extra money. e.g. Studying art, piano, photography, learning about space, genetic research as part of general curiosity.
 - 2) Financial rewards – Higher and better quality education provides higher earnings for an individual in the labor market.
 - 3) More education leads to better decision one can make about one's life.
 - 4) Higher education can lead to better chance for promotion.
 - 5) Higher education leads to better chance to find a job in case of lay-off and lower chance of being laid-off.
 - 6) Opportunities to network and to have mentors at college.

(b) What are the public or social benefits of education? Explain each type of social benefits that may accrue to the family members, community, or the whole society, with suitable examples.

- Public Benefits
 - At the family level: From your education, other family members such as your child (in future) & currently other siblings can get motivated for education.
 - Higher education of the mother leads to:
 - Lower fertility level
 - Higher education of the children
 - Better Health
 - Social Status of the whole family can go up.

- Your education will make you independent and thus you will not be a burden to the parents.
- Can provide parents better old-age support.
- Community Level – people in your neighborhood can benefit from your knowledge especially if the neighborhood is a little village
- Economy and World Level:
 - Education – higher earnings => higher tax revenues from which whole economy can benefit.
 - Improve civility, law & order.
 - With your education, you may discover some new medicine and new technology from which the whole society can benefit.

(c) Suppose social benefits exceed the private benefits. That may lead to a case for government subsidy for education. Can you explain why?

- Example: People paying taxes to educate the younger generation will benefit everyone from their knowledge.

Earnings function. Let w be the average yearly earnings of an individual. What are the determinants of w , i.e., w is a function of certain attributes of the individual such as s , the number of years of schooling, Age, etc. I.e.,

$wages = w(s, Age, \dots)$, a function of s , Age

what are the other important factors. Explain how these factors may have effect on an individual's market earnings. I.e., state how wages will change for individual with higher s , higher Age and all other factors.

- $Wages = fn(s, Ability, b, health, Age, Gender, \dots)$
 - s = # of yrs schooling & quality of schooling
 - Ability = innate ability or intelligence, denoted as t ,
 - b = social skills, communications, motivation most of which are acquired through family background and pre-school and early childhood development.
 - Gender
 - Race
 - Occupation
 - Health Status

5. Optimal schooling choice (Schooling as investment): Individuals vary in their innate ability, t , social skills acquired through family background b , and Gender (with the convention that if Gender = 1 female, and if Gender = 1 male), Racial background. Suppose for simplicity that each individual lives for two periods. In the first period he is young, he does not work, decides how many years of schooling s to have and goes to school. Here we are talking about schooling that the individual decides not his parents. In the second period he is adult, he goes to the labor market and earns wages in

the competitive labor market according to his schooling and other characteristics. We assume for simplicity that each level of schooling he needs a c dollars for tuition and all other expenses. He has to borrow money at the interest rate r per period to finance his schooling.

- a. Calculate the future net value of investment in s years of schooling, or equivalently, calculate the present value of his investment in s years of schooling.

Notice that s years of schooling will require him to borrow $c \cdot s$ dollars when young, so in the next period he will earn $w(s)$ and pay back his loan with interest, $(1+r)c \cdot s$, thus the future value is given by

$$w(s; \tau, \beta, \text{Age, Gender, Race, Occupation, Health}) - (1+r)c \cdot s$$

He maximizes above net future value (equivalently the present value) to choose his number of years of schooling. The above is illustrated in the following figure: In the figure, it is shown how the curves shift and the optimal solution change for an individual with higher

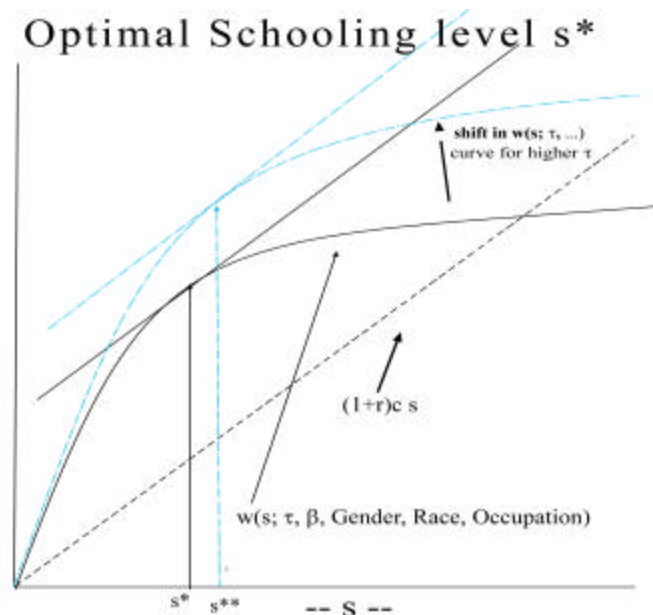


Figure 1: Optimal investment choice of schooling

In each of the following cases, show how the curves will shift and what will be the new optimal schooling solutions. Give an intuitive interpretation of why you think the optimal schooling changes the way you found it.

- b. An individual with higher β .
 - 1) Will have higher level of education.

- c. An individual with higher τ (Ability).
 - 1) Will have higher level of education.
- d. For a male compared to female as reference point.
- e. For an African American or Latino compared to White as reference point.
- f. An individual with poorer health with healthy individual as reference point.
 - 1) Lower education.

You can easily figure out what is happening in the diagram for each case above. It was done in the class. If you still have problem figuring it out, please see me, during the office hours. I will explain it again.

6. How does family background affect r , the interest rate? Because of this effect on r , which curve will shift which way for an individual coming from a poorer family background? What will be the effect on optimal schooling level? Show in the diagram.

Coming from poorer family means, generally the family will not have collateral such as house or family connection to borrow for children's college at lower interest rate. Thus if someone comes from a poorer family background, his/her cost of borrowing, i.e., r will be higher and thus his $(1+r)cs$ curve will be steeper than as shown in the above diagram. In that case, he will choose lower education level.

7. The criterion for school choice is based on business calculation, treating schooling as an investment. Explain what are the other factors that are important in actual schooling choices.

Someone might like to choose higher education for the sake of learning not just to make more money.

8. In the above, we have dealt with the schooling choices of the individuals themselves. That is, the criterion is applicable to individuals when they are age 16+, i.e., they are adults to make their own choices. However, schooling decisions prior to that age are made by parents. These decisions include pre-school investment, private or public school, in which neighborhood.

- a. Read Entwisle article (posted in the course site) and explain how pre-school investment is important in producing factors that are important for schooling and for labor market performance in terms of wage earnings (i.e., for learning and earning abilities). Which determinants in the above earnings function are affected by pre-school? Positively or negatively?

The Entwisle paper answers this question very well. Please make sure you read it. Some of the important points highlighted in class and in this paper are:

- Pre-school investments are strongly linked to a child's success in school. It has been found that pre-schools enhance a child's cognitive abilities and helps children to transition smoothly into elementary schools. In addition to the cognitive skills, the children who go to pre-school will have the necessary social skills that are required to succeed in schools. Pre-schooling will also reduce the likelihood that a child will have retain a group and the likelihood of falling into a low-achiever group. Entwisle argues that stratification in schools according to skill levels can have a long lasting negative impact on some kids by giving them and the parents a wrong message about the potential of the child. Therefore, the initial edge given in pre-school is very important in forming right expectations.
- Investments in pre-schools help form a child's cognitive skills, sociability and motivation. These qualities will enable the child to perform well in school, which in turn would enable him or her to succeed in the labor market. The skills acquired in pre-school (motivation, social skills etc.) at a formative age are also likely to have long term direct effect on future success in the labor market.

9. What are two different ways “equality of opportunities” may be hindered in our model? What kind of government policies will increase equality of opportunities in each case?

- Poorer families having higher interest rate of borrowing college fund is one way. Remedy for this is that government provide subsidized loans or give scholarships to students coming from poorer families.
- Students from poorer families will have poorer family background
 - b. Government could introduce programs such as Head Start to help poorer parents to send their kids to pre-school, and better quality primary and elementary schools.