Human Capital

Tutorial Session

Contents

1 Quiz

(1) Consider the seminal model by Spence (1973) as presented in class. High productivity workers always prefer the option to signal their ability.

(2) Based on the discussion in class, the option value of schooling is always strictly positive for all schooling transitions.

(3) The accounting-identity model as presented in Heckman, Lochner, & Todd (2006) provides a justification for interpreting the Mincer coefficient as an internal rate of return.

(4) A college tuition subsidy always leads to an increase in high school graduation rates regardless of the individual time preferences.

(5) Heckman, Stixrud, & Urzua (2006) report that the effect of cognitive skills on social outcomes is always more pronounced than the effect of noncognitive skills.

(6) Keane & Wolpin (1997) find that a basic model of human capital investment explains the observed investment patterns just as well as their extended model.

(7) Carneiro, Heckman, & Vytlacil (2011) find that individuals make their schooling decisions in light of heterogeneous returns.

(8) Keane & Wolpin (1997) point to heterogeneous schooling levels at age 16 as the main determinant of inequality in expected total lifetime utility.

(9) Heckman, Lochner, & Todd (2006) compile several pieces of evidence that point towards a rejection of the standard Mincer regression model.

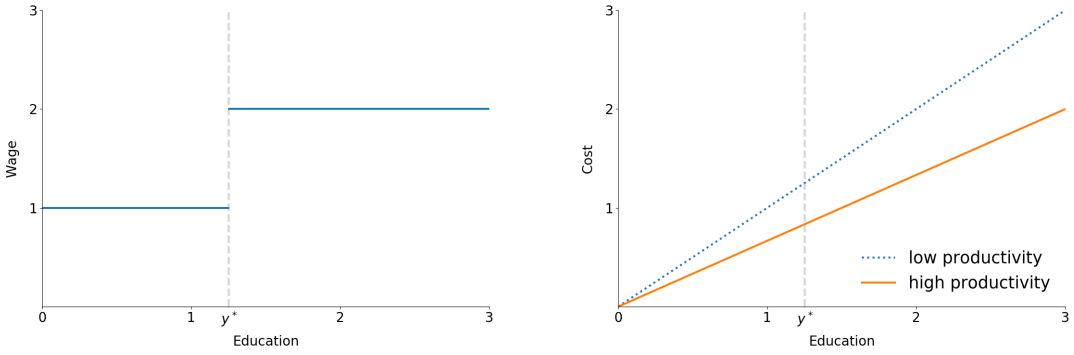
2 Introduction

Consider the motivating models of Spence (1973) and Ben-Porath (1967) as discussed in class.

(1) For both models, provide a brief description of the question they are designed to address and their key ingredients. Provide two examples of important economic features that are missing from the formal analysis?

Consider the model developed in Spence (1973) in more detail. Figure 1 visualizes the information about the wage schedule and the cost of education in the parametrized model. Please assume throughout that employers belief that individuals with a level of education $y^* \geq \frac{5}{4}$ have a high productivity.

Figure 1: Model parametrization

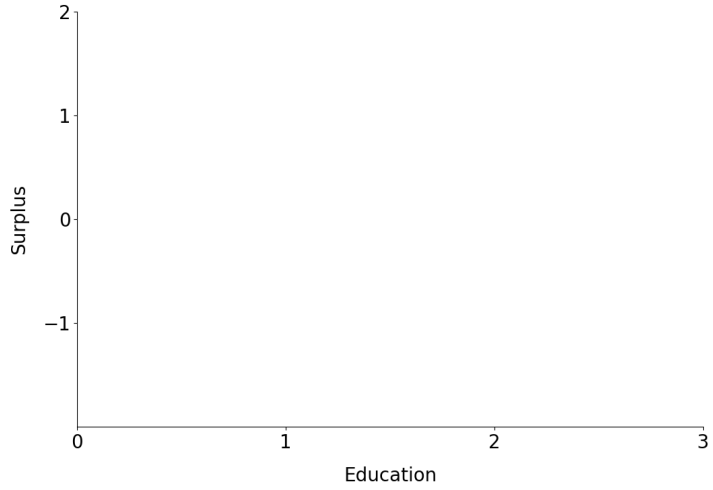


(a) Wage schedule **(b)** Cost of education

(2) Write down the parametrization of the cost (c_L, c_H) and wage (w_L, w_H) functions for the high and low productivity individuals.

(3) Complete Figure 2 by adding the surplus functions for each of the two groups over the specified range. Also, indicate the optimal level of schooling for each of the two groups.

Figure 2: Surplus of education



(4) Calculate the range of the separating schooling level y^* that confirms the employer's beliefs.

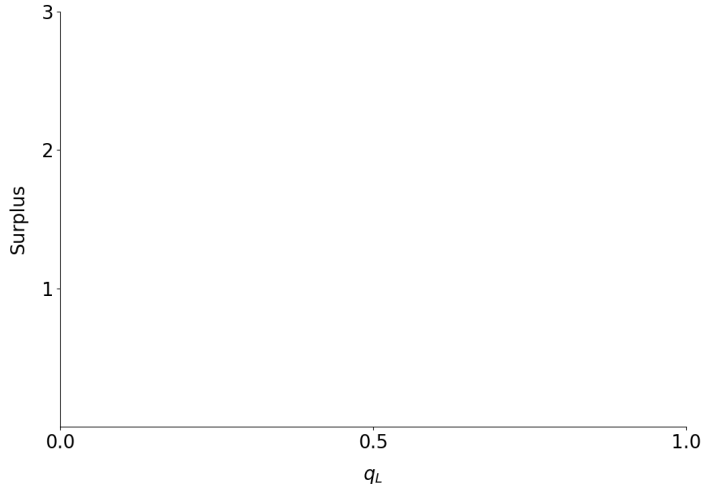
Now consider the case where individuals do not have the ability to signal their productivity and the share of individuals with low productivity is denoted by q_L.

(5) What is the wage for each of the two groups in this scenario as a function of q_L?

(6) Complete Figure 3 by adding the surplus and wage for the two groups under the scenario where individuals are able to signal their ability and when they are not.

(7) What scenario do high productivity individuals prefer, what does their assessment depend on, when exactly do they change their mind?

Figure 3: Surplus and market structure



3 Generalized Roy model

Consider the framework of the generalized Roy model presented in class for the static analysis of educational choice.

(1) Write down and briefly describe the key equations of the model.

(2) Formally define the conventional average treatment effects and describe their limited policy relevance. What is potentially lost by focusing on average effects instead of looking at the whole distribution of individual benefits?

(3) Define and describe the concept of essential heterogeneity. How does its presence and absence affect the relationship between the conventional average treatment effect parameters. Please integrate the conventional average treatment effects in the absence of essential heterogeneity into Figure 4 which already shows a hypothetical distribution of individual-specific benefits.

(4) Define and describe the marginal benefit of treatment. What exactly is the conditioning set? Complete the empty canvas below by sketching the marginal benefit of treatment in the presence and absence of essential heterogeneity. Ensure that both axes are properly labeled.

Figure 4: Distribution of effects

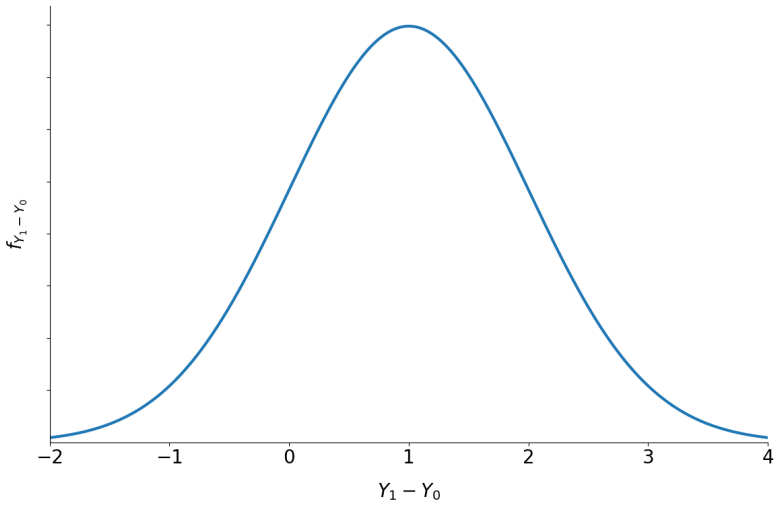
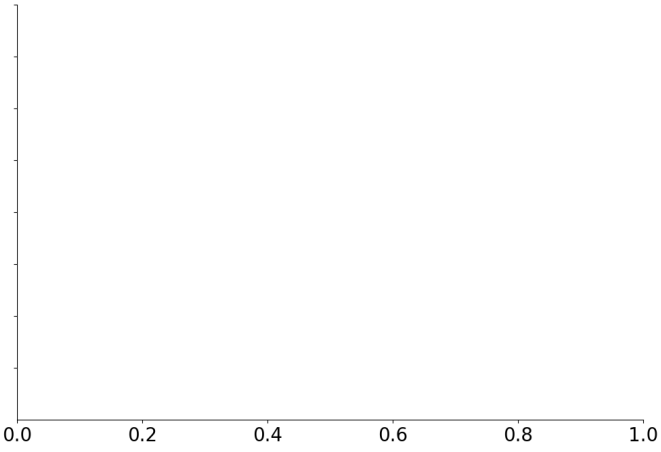


Figure 5: Marginal benefit of treatment



(5) What are the main findings in Carneiro et al. (2011) on the marginal benefit of a college education?

(6) Briefly outline the shortcomings of a static model of educational choice compared to a dynamic model.

References

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