

## **CHAPTER 9 - INVESTMENTS IN HUMAN CAPITAL: EDUCATION AND TRAINING**

Chapter 9 introduces students to the concept of human capital and treats in detail education and training investments. The chapter begins with a section on the demand for education by workers, in which a theory of human capital investment is formulated and a formal model of choice is presented. Implications of this model for both individual and aggregate (market) behavior are then derived.

The second section of the chapter analyzes the relationship between education and earnings. We introduce age/earnings profiles and discuss the reasons for their convexity. Included in this section is an analysis of the differential convexity among such profiles for men and women.

Next, we consider the question of whether education is a good investment. We analyze this question from both an individual and a social perspective. The major findings of the literature with respect to the individual rates of return to education are summarized, and we discuss possible biases (including selection biases) inherent in these findings. When discussing education as a social investment, we introduce both the traditional answers of the "human capitalists" and the more agnostic views of those who see education as purely a signaling device. In this context of evaluating education and training as investments, we devote a section to evaluations of government job training programs.

Appendix 9A presents and explains a "cobweb" model of labor market adjustment, in which the need for educational investments slows down the supply response to changes in market demand. Appendix 9B presents a hedonic model of education and wages that uses the graphic tools of Chapter 8. This hedonic model is useful in explaining several empirical facts about the relationship between education and wages, and the discussion also serves to integrate the concepts in Chapters 8 and 9.

### **List of Major Concepts**

1. Investments in human beings are part of the general category of investments.
2. Investments entail costs in the current term with returns flowing in over later periods.
3. Costs of human capital investments include out-of-pocket expenses, forgone earnings, and psychic losses.
4. Because investment returns flow in over several years, an analytical tool to convert future sums to present value is required (the concept of present value and discounting future sums is explained in some detail).
5. Human capital investments are more likely to be made by people who are not present oriented, by people who are young, in situations in which the costs of human capital

investments are lower, and in situations in which the returns to these investments are larger.

6. Variations in the returns to human capital investments call forth supply responses by individuals, affecting college enrollments in predictable ways.
7. Because education is costly, jobs that require more education or training must pay a higher wage to attract workers (that is, to compensate them for the cost of investment).
8. Age/earnings profiles are flatter for less educated workers, reflecting smaller human capital investment costs in their early years and lower growth of productivity.
9. Post-schooling investments in on-the-job training can help account for both the convexity and the fanning out of age/earnings profiles.
10. Post-schooling investments reduce actual earnings below potential earnings, and as such investments decline over age, one's actual earnings approach potential.
11. Some differences between men and women in the acquisition of education and training (including university majors) can be explained by lower rates of return to some human capital investments among "traditional" women, who expect interrupted labor market careers.
12. Evaluations of whether education is a good *individual* investment typically present rate of return estimates that involve three sets of biases: *upward biases* associated with the correlation between education and ability, *downward biases* associated with the failure of monetary earnings to reflect all the benefits of a college education, and *selectivity biases* arising from the fact that people who choose one career may be more productive in that career than a comparably trained person who does not choose that career.
13. Evaluations of whether education is a good *social* investment must consider the hypothesis that education acts as a screening device, rather than an activity that enhances productivity.
14. If the full cost of education is inversely related to ability, and if ability is positively related to on-the-job productivity, then firms can use educational attainment as a screening device (workers will sort themselves out according to ability in choosing their level of educational attainment).
15. Public sector job training programs have created demonstrable earnings gains only for adult women, and the present value of these gains typically exceed program costs.
16. (Appendix 9A) Delays in supply responses associated with the long gestation periods of some human capital investments can create periods of oversupply followed by periods of shortage (the "cobweb model" as it applies to the labor market).

17. (Appendix 9B) The hedonic model implies that those who obtain the most education are least averse to learning and probably most able to learn quickly.