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Preface

of age-earnings and age-wealth profiles. Finally, the discussion of rates of return covers a wider variety of evidence, groups, time periods, and implications than in other studies.

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CHAPTER I Introduction

SOME activities primarily affect future well-being; the main impact of others is in the present. Some affect money income and others psychic income, that is, consumption. Sailing primarily affects consumption, on-the-job training primarily affects money income, and a college education could affect both. These effects may operate either through physical resources or through human resources. This study is concerned with activities that influence future monetary and psychic income by increasing the resources in people. These activities are called investments in human capital.

The many forms of such investments include schooling, on-the-job training, medical care, migration, and searching for information about prices and incomes. They differ in their effects on earnings and consumption, in the amounts typically invested, in the size of returns, and in the extent to which the connection between investment and return is perceived. But all these investments improve skills, knowledge, or health, and thereby raise money or psychic incomes.

Recent years have witnessed intensive concern with and research on investment in human capital, much of it contributed or stimulated by T. W. Schultz. The main motivating factor has probably been a realization that the growth of physical capital, at least as conventionally measured, explains a relatively small part of the growth of income in most countries. The search for better explanations has led to improved measures of physical capital and to an interest in less tangible entities, such as technological change and human capital. Also behind this concern is the strong dependence of modern military technology on education and skills, the rapid growth in expenditures on education and health, the age-old quest for an understanding of the personal distribution of income, the

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recent growth in unemployment in the United States, the Leontief scarce-factor paradox, and several other important economic problems.

The result has been the accumulation of a tremendous amount of circumstantial evidence testifying to the economic importance of human capital, especially of education. Probably the most impressive piece of evidence is that more highly educated and skilled persons almost always tend to earn more than others. This is true of developed countries as different as the United States and the Soviet Union, of underdeveloped countries as different as India and Cuba, and of the United States one hundred years ago as well as today. Moreover, few, if any, countries have achieved a sustained period of economic development without having invested substantial amounts in their labor force, and most studies that have attempted quantitative assessments of contributions to growth have assigned an important role to investment in human capital. Again, inequality in the distribution of earnings and income is generally positively related to inequality in education and other training. To take a final example, unemployment tends to be strongly related, usually inversely, to education.

Passions are easily aroused on this subject and even people who are generally in favor of education, medical care, and the like often dislike the phrase "human capital" and still more any emphasis on its economic effects. They are often the people who launch the most bitter attacks on research on human capital, partly because they fear that emphasis on the "material" effects of human capital detracts from its "cultural" effects, which to them are more important. Those denying the economic importance of education and other investments in human capital have attacked the circumstantial evidence in its favor. They argue that the correlation between earnings and investment in human capital is due to a correlation between ability and investment in human capital, or to the singling out of the most favorable groups, such as white male college graduates, and to the consequent neglect of women, drop-outs, nonwhites, or high-school graduates. They consider the true correlation to be very weak, and, therefore, a poor guide and of little help to people investing in human capital. The association between education and economic development or between inequality in education and income is attributed to the effect of income on education, considering education as a consumption good, and hence of no greater causal significance than the association between automobile ownership and economic development or between the inequality in ownership and incomes.

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This study hopes to contribute to knowledge in this area by going far beyond circumstantial evidence and analysis. Part One treats the theory of investment in human capital in detail and reveals its importance through the wide variety of economic phenomena that it encompasses. Chapter II derives a number of important effects of such investments on earnings and employment, while Chapter III shows how to estimate the total amount invested and how it changes when the anticipated gains change.

Part Two presents various empirical tests of the theoretical analysis. Chapters IV and V estimate the gains from college education in the United States in recent years. Costs as well as returns are considered, and estimates are presented not only for selected groups, such as white male college graduates, but also for typical college entrants (sections 1 and 3 of Chapter IV). Detailed attention is paid to the effect of the correlation between education and ability, and to the variation in the gain from college (sections 2 and 4 of Chapter IV). Social as well as private gains are estimated, and both are compared to corresponding estimates for physical capital (Chapter V).

Chapter VI briefly extends the discussion to high-school education, considering social as well as private costs and returns, and the effect of differential ability (section 1). This chapter also tries to discover the secular trend in the United States during the twentieth century in the economic effects of high-school and college education (section 2).

Chapter VII tests the implications of the theoretical analysis concerning the effect of human capital on the shape of age-earnings profiles (section 1). Also considered is the effect on the relation between age and the discounted value of subsequent earnings, which are called age-wealth profiles. These profiles are applied to the study of life-cycle variations in savings and consumption, and in a few other ways (section 2).

Perhaps it is best to conclude the introduction by emphasizing that the attention paid to the economic effects of education and other human capital in this study is not in any way meant to imply that other effects are unimportant, or less important than the economic ones. The advantages of a division of labor are no less real here than they are in research in general. I would like to urge simply that the economic effects are important and they have been relatively neglected, at least until recently.

PART ONE
THEORETICAL ANALYSIS

"The most valuable of all capital is
that invested in human beings."

Alfred Marshall, *Principles of Economics*