Volume Title: Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, First Edition

Volume Author/Editor: Gary S. Becker

Volume Publisher: NBER

Volume ISBNs:

Volume URL: http://www.nber.org/books/beck-5

Conference Date: n/a

Publication Date: 1964

Chapter Title: Front matter, preface

Chapter Author(s): Gary S. Becker

Chapter URL: http://www.nber.org/chapters/c14406

Chapter pages in book: (p. i – xvi)

HUMAN CAPITAL

A THEORETICAL AND EMPIRICAL ANALYSIS, WITH SPECIAL REFERENCE TO EDUCATION

GARY S. BECKER

HUMAN CAPITAL

A Theoretical and Empirical Analysis, with Special Reference to Education

National Bureau of Economic Research
Number 80, General Series

Human Capital

A THEORETICAL AND EMPIRICAL ANALYSIS, WITH SPECIAL REFERENCE TO EDUCATION

BY
GARY S. BECKER
Columbia University

PUBLISHED BY
NATIONAL BUREAU OF ECONOMIC RESEARCH
NEW YORK

Distributed by
Columbia University Press
New York and London
1964

L.C. Card No. 64-7748

Printed in the United States of America

Relation of the Directors to the Work and Publications of the National Bureau of Economic Research

1. The object of the National Bureau of Economic Research is to ascertain and to present to the public important economic facts and their interpretation in a scientific and impartial manner. The Board of Directors is charged with the responsibility of ensuring that the work of the National Bureau is carried on in strict conformity with this object.

2. To this end the Board of Directors shall appoint one or more Directors of Research.

3. The Director or Directors of Research shall submit to the members of the Board, or to its Executive Committee, for their formal adoption, all specific proposals concerning researches to be instituted.

4. No report shall be published until the Director or Directors of Research shall have submitted to the Board a summary drawing attention to the character of the data and their utilization in the report, the nature and treatment of the problems involved, the main conclusions, and such other information as in their opinion would serve to determine the suitability of the report for publication in accordance with the principles of the National Bureau.

5. A copy of any manuscript proposed for publication shall also be submitted to each member of the Board. For each manuscript to be so submitted a special committee shall be appointed by the President, or at his designation by the Executive Director, consisting of three Directors selected as nearly as may be one from each general division of the Board. The names of the special manuscript committee shall be stated to each Director when the summary and report described in paragraph (4) are sent to him. It shall be the duty of each member of the committee to read the manuscript. If each member of the special committee signifies his approval within thirty days, the manuscript may be published. If each member of the special committee has not signified his approval within thirty days of the transmittal of the report and manuscript, the Director of Research shall then notify each member of the Board, requesting approval or disapproval of publication, and thirty additional days shall be granted for this purpose. The manuscript shall then not be published unless at least a majority of the entire Board and a two-thirds majority of those members of the Board who shall have voted on the proposal within the time fixed for the receipt of votes on the publication proposed shall have approved.

6. No manuscript may be published, though approved by each member of the special committee, until forty-five days have elapsed from the transmittal of the summary and report. The interval is allowed for the receipt of any memorandum of dissent or reservation, together with a brief statement of his reasons, that any member may wish to express; and such memorandum of dissent or reservation shall be published with the manuscript if he so desires. Publication does not, however, imply that each member of the Board has read the manuscript, or that either members of the Board in general, or of the special committee, have passed upon its validity in every detail.

7. A copy of this resolution shall, unless otherwise determined by the Board, be printed in each copy of every National Bureau book.

(Resolution adopted October 25, 1926, as revised February 6, 1933, and February 24, 1941)

To my wife Doria

For encouragement and support during a long period of production

This study was made possible by funds granted by the Carnegie Corporation of New York to the National Bureau. The Carnegie Corporation is, however, not to be understood as approving or disapproving by virtue of its grant any of the statements made or views expressed herein.

Contents

	PREFACE	xv
I.	INTRODUCTION	1
	PART ONE: THEORETICAL ANALYSIS	
II.	INVESTMENT IN HUMAN CAPITAL: EFFECTS ON EARNINGS	7
	1. On-the-Job Training	8
	General Training	11
	Specific Training	18
	2. Schooling	29
	3. Other Knowledge	31
	4. Productive Wage Increases	33
III.	INVESTMENT IN HUMAN CAPITAL: RATES OF RETURN	37
	1. Relation Between Earnings, Costs, and Rates of Return	37
	2. The Incentive to Invest	49
	Number of Periods	49
	Wage Differentials and Secular Changes	52
	Risk and Liquidity	55
	Capital Markets and Knowledge	56
	3. Some Effects of Human Capital	58
	Examples	58
	Ability and the Distribution of Earnings	61
	PART TWO: EMPIRICAL ANALYSIS	
IV.	RATES OF RETURN FROM COLLEGE EDUCATION	69
	1. Money Rates of Return to White Male College Graduates	70
	Returns in 1939	70
	Costs in 1939	74
	Rates of Return in 1939	75
	Rates of Return in 1949	78
	2. Some Conceptual Difficulties	79
	Correlation Between "Ability" and Education	79
	Correlation Between Education and Other Human Capital	88
	3. Rates of Return to Other College Persons	90
	College Drop-Outs	91
	Nonwhites	94
	Women	100
	Rural Persons	103
	4. Variation in Rates of Return	104

V.	UNDERINVESTMENT IN COLLEGE EDUCATION?	114
	1. Private Money Gains	114
	2. Social Productivity Gains	117
	3. Private Real Rates	121
VI.	RATES OF RETURN FROM HIGH-SCHOOL EDUCATION AND TRENDS OVER TIME	124
	1. The Rate of Return from High-School Education	124
	2. Trends in Rates of Return	127
	After 1939	128
	Before 1939	131
VII.	AGE, EARNINGS, WEALTH, AND HUMAN CAPITAL	136
	1. Age-Earnings Profiles	138
	2. Age-Wealth Profiles	145
VIII.	SUMMARY AND CONCLUSIONS	153
	1. Summary	153
	2. Future Research	156
	3. Concluding Comments	159

Appendixes

A.	SOURCES AND METHODS	160
	1. Incomes	160
	a. The Basic Data	160
	b. Under- and Overreporting	163
	c. Unemployment	164
	d. Coverage in 1939	165
	e. Taxes	167
	f. Urban-Rural Distribution	168
	g. Hours of Work	169
	2. Costs	169
	a. Earnings of Students	169
	b. Direct Private Costs	172
	c. Direct Social Costs	175
B.	MATHEMATICAL DISCUSSION OF RELATION BETWEEN AGE, EARNINGS, AND WEALTH	178
	INDEX	185

Tables

1.	Actual Earning Differentials Between Urban, Native-White, Male College and High-School Graduates in 1939 at Various Ages	71
2.	Alternative Estimates of Rates of Return to 1939 Cohort of Native-White Male College Graduates	76
3.	Earning Differentials Between White Male College and High-School Graduates in 1949 at Various Ages	77
4.	Several Measures of Ability at Different Educational Levels in the 1950's	80
5.	Mean Salaries of Illinois, Minnesota, and Rochester Men, by Rank in High-School Graduating Class and by Intelligence Test Score	83
6.	Average and Marginal Market Discrimination Against Non-Whites for Various Age and Education Classes, by Region, 1939	97
7.	Family Incomes of Married Men and Women in 1960, by Education and Years After First Job	102
8.	Coefficients of Variation in After-Tax Income of White Males, by Age and Years of Education, 1939 and 1949	104
9.	Coefficients of Variation in Mortality and Cohort Incomes for College and High-School Graduates, by Age, 1939 and 1949	106
10.	Coefficients of Variation in the Returns to College Graduates, by Age, 1939 and 1949	110

11.	Investment in College Education Relative to Physical Capital for Selected Years	122
12.	Average I.Q. at Several Educational Levels	125
13.	Investment in High-School Education, College Education, and Physical Capital, 1900–56	126
14.	Private Rates of Return from College and High-School Education for Selected Years Since 1939	128
15.	Percentage of Population with High-School and College Education in 1940, 1950, and 1957	130
16.	Income Differentials Between College and High-School Graduates at Various Ages and for Scattered Years Since 1904 in Current and 1958 Dollars	132
17.	Income Differentials Between High-School and Elementary-School Graduates at Various Ages and for Scattered Years Since 1900 in Current and 1958 Dollars	133
18.	Net After-Tax Incomes of White Males in 1939 and 1949, by Age and Years of Education	138
19.	Estimated Incomes over Time of Cohorts at Different Educational Levels	141
20.	Annual Rates of Income Change Between Successive Age Classes for 1939 Cohorts at Different Educational Levels	144
A-1.	Open-End Means Used in Calculating 1949 Incomes	161
A-2.	Three Estimates of Before-Tax Income Differentials Between Education Classes in 1949	162
A-3.	Fraction Reporting No Income Among White Males in 1949 by Age and Education Class	163
A-4.	Comparison of Incomes Reported by Census and Commerce for 1946 and 1954	164
A-5.	Adjustment for Unemployment in 1939 by Education Class	165
A-6.	Average Earnings of Census College Graduates and Independent Doctors, Dentists, and Lawyers in 1939	166

A-7.	Fraction of Native Whites and Urban Whites Included in 1939 Data, by Age and Education	167
A-8.	Distribution of Persons of Different Educational Levels by Size of Place of Residence, 1939	168
A-9.	Average Hours Worked in 1939, by Educational Level	169
A-10.	Alternative Estimates of Fraction of Earnings of High-School Graduates of Same Age Received by College Students	170
A-11.	Alternative Estimates of Earnings of Persons Aged 14–17 with Eight Years of Schooling, 1949	171
A-12.	Alternative Estimates of Fraction of Earnings of Elementary-School Graduates of the Same Age Received by High-School Students	172

Charts

1. Relation of Earnings to Age 15
2. "Time Series" Age-Earnings Profiles for Several 1939 Education Cohorts 140
3. Age-Wealth Profiles of 1939 Graduates 146

Preface

THE origin of this study can be traced both to the finding that a substantial growth in income in the United States remains after the growth in physical capital and labor has been accounted for and to the emphasis of some economists on the importance of education in promoting economic development. My original intention was to shed some exploratory light on these issues by bringing together readily available information from Census reports on the incomes of persons with different amounts of education and from the Office of Education on the costs of education. For if education were economically important, I reasoned, money rates of return on education ought to be significant.

A long time has elapsed between the start, back in 1957, and the appearance of this monograph presenting the full analysis. During that time interest in the economics of education has mushroomed throughout the world and stimulated a profusion of research and policy proposals. Estimates have been made of the amounts invested in and the rates of return on education in both rich and poor countries. Perhaps some of the expanding interest can be traced to preliminary reports on the National Bureau study.[1]

This interest and further reflection, in turn, encouraged me to transform the original aim into a more ambitious undertaking. I became interested in the general theory of investment in human capital with its ramifications for a variety of economic phenomena. The theoretical analysis in turn led to an empirical examination of several other effects of education, such as those centering around the shapes

[1] The previously published reports consist of "Underinvestment in College Education?" *American Economic Review,* May 1960, and "Investment in Human Capital: A Theoretical Analysis," *Investment in Human Beings,* NBER Special Conference 15, supplement to *Journal of Political Economy,* October 1962.

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.

Support, assistance, and criticism were generously provided by many institutions and persons during the course of this study. Let me first thank the Carnegie Corporation of New York for their two grants to the National Bureau to explore work on the economic effects of education. Leave from teaching duties was provided by the Ford Professorship at Columbia University during the academic year 1960–61, and a Ford Faculty Fellowship during 1963–64.

The study would have been impossible without the aid of a series of unusually able and conscientious research assistants. Major contributions were made by Rosanne Cole, Linda Kee, and Eugenia Scandrett, with additional assistance from Mary Holman Faden, Shirley Johnson, and June Cohn.

T. W. Schultz, the major figure in the economics of education, has been liberal with encouragement and most helpful with criticism. I feel greatly indebted to him, and would like to record my appreciation here. Jacob Mincer has been exceedingly helpful in countless discussions and on numerous drafts with suggestions, criticisms, and that intangible asset—enthusiasm.

The National Bureau reading committee played an important role in improving the content. I am indebted to George J. Stigler, Richard Easterlin, Albert Fishlow, Milton Friedman, and Zvi Griliches. Many others commented on all or parts of various drafts. I would like to acknowledge the helpful contributions of M. Blaug, Arthur F. Burns, Edward F. Denison, Evsey Domar, Solomon Fabricant, Victor R. Fuchs, Leo Goodman, W. Lee Hansen, Hendrick Houthakker, C. Harry Kahn, James N. Morgan, Selma Mushkin, Alice Rivlin, and of various participants in the Labor Workshop at Columbia University. Members of the National Bureau Board of Directors who provided useful comments were V. W. Bladen, Marion B. Folsom, W. Allen Wallis, and Joseph H. Willits.

I am grateful to the editorial staff of the National Bureau, especially to Marie-Christine Culbert for her detailed and incisive comments. H. Irving Forman skillfully drew the charts.

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 physicial 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