HUMAN CAPITAL

by

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I: INTRODUCTION

The recent interest in the concept of human capital is attributable to the presidential address of Theodore Schultz at the American Economic Association, December 28, 1960. This address entitled "Investment in Human Capital" has been seminal in terms of the vast amount of research which followed.

The purpose of this paper is to review the literature on human capital, to point out difficulties in its measurement, and to provide some indication of the meaningfulness of the concept.

Specifically, the first part of the paper is concerned with the controversial history of the concept of capital, extending over the period from Quesnay through Smith, Ricardo, Mill, Marx, Marshall, to very recent economists.

Secondly, the mensuration difficulties raised by the hetergeneity of capital (the index number problem) and quantity-value data alternatives are discussed.

In the final portion of this paper, some indication of the meaningfulness of the concept of human capital is provided in an analysis of an aspect of economic pluralism in the United States.

II: CONCEPT OF HUMAN CAPITAL -- HISTORY

Human capital, as it is most widely defined today, is the knowledge, skills, attitudes, aptitudes, and other acquired traits of a human being which contribute to his productive ability. Those expenditures and labors contributing to the acquisition of these valuable traits are designated as investment in human capital. This is,

however, an overly simplified explanation and neglects the many uncertainties and difficulties that arise from the definition alone. These problems will, perhaps, best come to light through a consideration of the history of the concept of capital in the general sense of the term.

Throughout the history of economic analysis, there have been controversies over the definition of capital. Indeed, few of the past eminent economists agreed on any one criterion for capital, and, consequently, each had his own personal definition, which included different varieties of factors to be counted as capital.

Originally in medieval Latin, the meaning of the word was the principal of a money loan. As it was observed that the interest bearing power of money was borrowed from the productive power of the things money could buy, the conception of "capital" widened to embrace both money, the representative thing, and goods, the represented thing.

A. The Physiocrats - Quesnay

François Quesnay, leader of the first systematic school of political economy, laid the foundation of that part of economic theory concerning human capital. Working with his elaborately planned farm program, Quesnay came in touch with all the details of technical and business farming policies, and from his realistic investigations, formulated his theory of capital. He divided capital requirements into "avances foncieres," initial expenditures on long-lasting projects, "avances primitives," expenditures on equipment, and "avances annuelles," the current expenditures.

There is no doubt that Quesnay was confronted by all the problems that have since plagued students of the theory—problems of designation and of expression. For

instance, were these stocks to be measured in terms of goods and services, or in terms of money? There are, as Schumpeter points out, rich and indefinite possibilities enshrined in the word avances. Even though his attempts at solving these problems were rudimentary, they formed the basis for further work on the matter.[1]

Turgot devotes a major portion of his treatise, Reflextions, to a capital theory that anticipates most of the nineteenth-century work. Seizing upon the groundwork laid by Quesnay, he worked out his "advance" theory of capital, emphasizing that wealth in addition to natural agents is indispensible for all production.[2] Indeed, according to Böhm von Bawerk, Turgot designated all saved goods as capital.

> "Whoever, he says in his Reflexions sur la Formation et la Distribution des Richesses," gets possession of more goods in a year than he requires to use, can lay past the surplus and accumulate it. These accumulated goods are what people call Capital...It is absolutely the same whether this sum of goods, or this Capital, consists of a mass of metal, or of other things, since money represents every kind of goods, just as, on the other side, all other kinds of goods represent money."[3]

As the concept was widened and deepened, the controversy over capital increased. Though economists were late to employ an articulate analysis of the nature and function of capital, once begun, many formulated their respective views on the matter. By looking into the capital theories of successive economists, this becomes quite apparent.

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[1]J. A. Schumpeter, History of Economic Analysis (New York, 1959), pp. 235-237.

[2]Ibid., pp. 323-4.

[3]Turgot, Reflextions, quoted by Eugen V. Böhm-Bawerk in The Positive Theory of Capital (New York, 1923), p. 25.

B. Classical Economists

Physiocrat influence is recognizable in Adam Smith's concept of capital which is set forth in the second Book of The Wealth of Nations. In Chapter I of the Second Book, he specifically distinguishes that part of a man's and society's total stock of goods that is to be called capital. He introduces the concepts of fixed and circulating capital and classifies the goods that are to come under each heading. Quesnay's avances are suggestive of Adam Smith's Circulating Capital, that going from one step to another and yielding profit only by the successive exchanges; and Fixed Capital, that yielding a profit without further circulation. To these catagories of saved stock, Smith added a third portion consisting of goods reserved for immediate consumption and affording no revenue or profit. Only those parts destined to the creation of profit did he designate as capital.[4]

Adam Smith gave as the fourth item in his list of the constituents of fixed capital the following:

> ...the acquired and useful abilities of all the inhabitants or members of the society. The acquisition of such talents, by the maintenance of the acquirer during his education, study, or apprenticeship, always costs a real expense, which is a capital fixed and realised, as it were, in his person. Those talents, as they make a part of his fortune, so do they likewise of that of the society to which he belongs. The improved dexterity of a workman may be considered in the same light as a machine or instrument of trade which facilitates and abridges labor, and which, though it costs a certain expense, repays that expense with a profit.[5]

This is, indeed, a bold inclusion of acquired and useful abilities of man within the capital framework.

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[4]Adam Smith, The Wealth of Nations (New York, 1924), pp.241-250.

[5]Ibid., p. 247.

David Ricardo embraces both wage goods and plant, equipment, and raw materials in his concept. He defined capital as "that part of the wealth of a country which is employed in production, and consists of food, clothing, tools, ... machinery ..., necessary to give effect to labour."[6] Ricardo counts food and clothing as a part of physical capital, but he does not consider these items in terms of human capital.

In the opinion of John Stuart Mill, as set forth in Principles of Political Economy, capital consists of "the accumulated stock of the produce of former labor."[7] The function of capital is to afford the shelter, tools, protection, and materials which are requirements of the job, and to feed and maintain the laborers during the production process. The distinguishing factor between capital and non-capital lies not in the kind of commodity, but in the capitalist's employment of them for one purpose rather than another. All property becomes a part of capital as soon as it, or the value to be received from it, is allocated to productive reinvestment. The sum of all so-destined values by the respective possessors constitutes the capital of a country, regardless of whether or not those values are in a shape directly applicable to productive uses.[8]

Mill classifies capital as circulating and fixed. The circulating capital, which after use is no longer capital and, therefore, no longer functions in production, must be constantly renewed by sale of finished products. Fixed capital is, of course, of more

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[6] D. Ricardo, Principles of Political Economy and Taxation (New York, 1917), p.53.

[7] John S. Mill, Principles of Political Economy (New York, 1909), p. 34.

[8] Ibid., pp. 35-36.

permanent nature, its return being spread over a period. There is a great difference in the effects of the two on the amount of a country's gross produce.[9]

It was J. S. Mill's opinion that people should not be regarded as wealth because the existence of wealth is only for the sake of the people. As Schultz points out, however, the concept of human wealth is not really in conflict with his view that wealth exists only for the sake of the people. To be sure, the investment in oneself, by enhancing one's range of choice, works to that person's advantage.[10]

In Chapter II, Book I of Principles of Political Economy, Mill discusses "labor of which the subject is human beings," touching on an important element of human capital, yet denying that it may be considered as such. For the community, he states, the labor and expense of child-rearing form a part of the outlay which is a condition of production. Since, however, this labor and expense are not usually incurred by the individuals for the attainment of ultimate return, it is not necessary to be taken into account as expenses of production. The labor employed in technical or industrial education of a community, he goes on to say, is for the exclusive purpose of increasing produce and may be therefore considered as part of the cost of produce to society. At best, he concedes that "when society and not the individuals are considered, this labor and outlay must be regarded as part of the advance by which society effects its productive operations...."[11]

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[9]Ibid., pp. 57-58.

[10]T.W. Schultz, "Investment in Human Capital," The American Economic Review, 51 (March 1961), p. 2.

[11]Mill, Op. Cit., pp. 25-26.

Karl Marx, who may be counted a member of the classical school, added little to the basic concepts of capital hitherto presented. He did, however, in accordance with his principle of amalgamating economics and sociology, confine the term capital to the general things of the class previously mentioned that are owned by capitalists. Capital becomes, thereby, a stock of productive instruments for the exploitation of the laborers. This same stock in the hands of the workman and used by him is not capital.[12]

Marx divided capital into "constant capital," the sum of depreciation charges on fixed capital and inputs of raw materials, and "variable capital," the wages of production workers. What he denoted by the term "constant capital" Schumpeter later called "technological capital." What Marx termed "variable capital," writers from Smith to J. S. Mill recognized as "wage capital."[13] Introducing a coefficient describing the qualitative relationship between the two, he set up the ratio c/c + v (where c is constant capital and v, variable capital). This ratio, which he called the Organic Composition of Capital, is a pure number.[14]

C. Neoclassical Economists

Although there is evidence that Böhm-Bawerk's theory of capital was subjectively original, it appears in many ways as chiefly an elaboration of the Jevonian ideas. In the early part of his book, he discusses capital "as existing in different senses in the

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[12]Schumpeter, op. cit., p. 634.

[13]M. Blaug, Economic Theory in Retrospect (Homewood, Ill., 1962), pp.207-8.

[14]Schumpeter, op. cit., p. 635.

sphere of production and in the sphere of distribution. In production he designated capital as a factor or tool of production used to extort from nature the forms of wealth unattainable by simple labor. But, according to his concept, capital in the area of distribution is the source of income or rent. Contrary to the main currents of economic thought which has taken the two phenomena to be intimately and essentially connected, Böhm-Bawerk holds them as two distinct subjects, bearing, of course, the identical name and inner relationships.[15]

He builds the foundation of his concept from the essential relationship of man and nature. Man strives after happiness, this happiness resting upon the satisfaction of want. The instrument of satisfaction, i.e., goods, are fashioned by man from "imperishable matter."[16] The production of goods may be by direct methods or by a "roundabout way." This roundabout method, leading to greater results than the direct method, avails itself of the assistance of concrete capital, such as raw material, tools, and machinery. It is the complex of intermediate products appearing on the several stages of the roundabout process, that he designated capital.[17]

Böhm-Bawerk's intermediate products capital is in actuality a subsistence fund with the same role as Jevons' wage-good capital. However, there is depth in Böhm-Bawerk's conception that is lacking in Jevons', for instance, his concept of intermediate products as consumers' goods in the process of maturing.[18]

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[15]Böhm-Bawerk, Op. Cit., pp. 1-3.

[16]Ibid., pp. 7-16.

[17]Ibid., pp. 17-22.

[18]Schumpeter, Op. Cit., pp. 903-905.

It was Böhm-Bawerk's belief that the main source of difficulty along these lines is the desire of economists to have one compact and inclusive capital concept. This desire leads to the treatment of two series of fundamentally different phenomena and problems under the same name.

> Capital, as National Capital, became the central figure of the weightiest problems of Production; as Private Capital, of the fundamentally distinct problem of Interest.[19]

While almost every economist thought that capital must be defined by one uniting conception, they divided with regard to the characteristics which should be attributed to the term, some thinking more about the instruments of production and others thinking chiefly of the source of income. This, he said, was the predominant cause of divergent definitions. To it was added, however, the disagreement of economists in each section over the various items to group together under their respective definitions. Thus there evolved not only different definitions for the concept, but also a good deal of disagreement as to the essence of the various definitions. According to Böhm-Bawerk, the matter of dispute lies not in the definition, but in the thing defined, and the solution to the controversy rests in the general acceptance of one definite conception: Capital in general to be called a "group of Products which serve as means to the Acquisition of Goods," and capital in a narrower conception, i.e., Social Capital, to be called a group of products which serve as means to the socio-economical Acquisition of Goods, or a group of Intermediate Products.[20]

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[19]Böhm-Bawerk, op. cit., p. 27.

[20]Ibid., pp. 24-38.

Böhm von Bawerk was very strongly opposed to the holding of human beings as capital. This theory, he felt, was devised in interest of the poor for class reconciliation. Steering a middle course between the iron law of wages theory on the one hand and socialist theory on the other, such a theory of human capital required that the owner of national capital share his interest with the owner of personal capital. Böhm-Bawerk admitted the existence of a certain analogy between a worker and a piece of capital, but insisted that the theory fails with regard to wage and interest. While the wage for labor is, he said, merely a price for labor, interest for capital is much more complicated.[21]

Jevons in his chapter on the theory of capital in Theory of Political Economy, professes himself at the outset in fundamental agreement with the classical (Ricardian) tradition. Considering the inclusion in the Ricardian capital concept of such disparate things as wage goods together with plant, equipment, and raw materials, he thought that the term capital should be confined to wage goods only. The distinctive function of this wage-good capital he defined as the support of labor. A special feature of this capital, he elaborated, is to allow the expenditure of labor in advance. Improvements in this supply of capital would, therefore, lengthen the average interval between the time the labor is exerted and the ultimate accomplishment of purpose.[22]

Representative of those against a treatment of humans as capital is Marshall. Marshall admitted that humans are from an abstract and mathematical point of view

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[21] Ibid., pp. 50-54.

[22] Jevons, Theory of Political Economy (London, 1911), pp. 222-224.

capital, yet insisted that they should not be treated as such in practical analysis.

> The writing of Professor Fisher contains a masterly argument, rich in fertile suggestion, in favor of a comprehensive use of the term. [capital] Regarded from the abstract and mathematical point of view, his position is incontestable. But he seems to take too little account of the necessity for keeping realistic discussions in touch with the language of the market-place....[23]

On the other hand, H. von Thünen asserted that the concept of human capital should most definitely be considered, stressing especially the importance of such a consideration in time of war. Thünen believed an awareness of the economic value of the human being would lead to a more conscious effort to preserve lives in battle.[24]

Early in The Nature of Capital and Income, Irving Fisher points out that human beings constitute an important part of the wealth of a nation. But this is, he says, a very difficult form of wealth to evaluate and the usual calculations of it are of more theoretical than practical significance.[25]

The list of definitions, concepts, and theories concerning capital continues in almost inexhaustable number. Senior went so far as to say in his Outline of the Science of Political Economy, "the term Capital has been so variously defined that it may be doubtful whether it has any generally received meaning."[26]

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[23]Alfred Marshall, Principles of Economics (London, 1920), pp. 787-88.

[24]Schultz, "Investment in Human Capital," pp. 2-3.

[25]Irving Fisher, The Nature of Capital and Income (New York, 1912), pp. 5, 17.

[26]Nassau W. Senior, An Outline of the Science of Political Economy (London, 1938), p. 58.

To be sure, it is Schumpeter's opinion that this is true in so far as it concerns minor faults of conceptualization which the individual authors commit, or their desire for a unitary or all-purpose concept of capital. It might also be true in the wish of many authors to set the "capital" in their analysis to correspond to the asset or liability side of a business's balance sheet, or the waverings of some men between physical capital concepts and monetary concepts. These are, however, faults which he believes are easily overcome. Propounding the idea that there is really only one dominant analytic purpose that most of the leading economists are in effect trying to serve, Schumpeter believed the matter to be much less complex than it appears.[27] In any case it is clear that though most of the past economists differ in varying degrees as to the factors to be counted as capital, the majority of them are in agreement that human beings should not be regarded as capital. The recoiling of economists from a consideration of investment in man and from the consequential treatment of human beings as capital seems the result of serious psychological and philosophical conflicts, as well as of the pressure of convenience in marginal productivity analysis.

To be sure, the fact that a nation's people constitutes an important part of its wealth has long been recognized by economists. But in spite of this recognition, economists have been exceedingly reluctant to treat the investment of people in themselves, per se. At the very roots of the problem lie the prevailing values and beliefs prohibitive of any view of human beings as wealth augmentable by investment. Such a consideration of man as a capital good seems contrary to these values and debasive of man. The previously mentioned convenience in marginal productivity analysis of

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[27]Schumpeter, op. cit., p. 632.

treating labor as a "unique bundle of innate abilities wholly free of capital" combines with the moral and philosophical issue to steer most economists clear of the subject of human capital.[28] The several all-inclusive concepts of the Classical and Neoclassical economists were for the most part dismissed by those who stood opposed to this view of man as capital.[29]

III: MODERN VIEWS ON HUMAN CAPITAL

For the most part, modern economics has not taken upon itself the task of remedying this important omission in economic analysis by any systematic analysis of human capital. Theodore Schultz offers several likely reasons for this. For one thing, the classical division of productive factors into land, labor, and capital has been hard to break with. Schultz suggests as an alternative to this, the treatment of the services of land, man, and reproducible capital forms. Secondly, economists have been reluctant to surrender the convenience of treating labor as a homogeneous input, free of any capital components of which the conventional measure as an input is "manhours worked." But the chief factor in this neglect of human wealth he attributes to the conventional restriction on the concept of capital.[30]

Indications are that a large number of paradoxes and unexplained phenomena in our economic system can be logically accounted for when human investment is dealt with

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[28] T. W. Schultz, "Investment in Human Capital," pp. 2-3.

[29] T. W. Schultz, "Investment in Man: An Economist's View," Social Service Review, June, 1959, vol. 33, pp. 110-111.

[30] Ibid., pp. 110-111.

as such. For instance, the observation that farm people taking industrial jobs earn less than fellow "industrial bred" workers of similar race, age, and sex, may be explained by the difference of an investment in education and training. Similarly, the competitive advantage exercised by younger men entering the labor force with fairly extensive schooling, over older men with little education is accounted for by differences in the "amount of human capital" they embody. Internal migration of workers, yet another form of human investment, accounts for further advantages of the young over the old in taking advantage of optimum job opportunities.[31]

Moreover, three major puzzles in the area of economic growth may be resolved through the inclusion of human investment in economic analysis. Firstly, the seemingly inconsistant long-period behavior of the capital-income ratio becomes explained. In this case, the failure to take human capital into account results in the inaccurate conclusion that employment of capital declines relative to income as economic growth proceeds. Since it is probable that human capital has been increasing at a rate greater than nonhuman capital, it is wrong to infer that the stock of all capital has been decreasing relative to income.

Along these same lines, the omission from input estimates of improvement in input quality is a likely reason for the discrepancy of estimates showing national income increasing faster than national resources. And, thirdly, investment in human capital is crucial in accounting for the essentially unexplained large increase in the real earnings of workers. The practice of holding the unit of labor constant when measuring the increase in productivity per unit of labor has resulted in this perplexing phenomena.

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[31]Schultz, "Investment in Human Capital," p. 4.

According to the theory of Schultz, the unit of labor has actually been increasing as a result of a steadily growing amount of human capital per worker.[32]

Like Schultz, there are an increasing number of other modern economists who are coming to the conclusion that a treatment of investment in technical knowledge of the population and improvements in education, health, and skills should be undertaken. The fact that people do in truth invest in themselves seems undeniable. It is indeed a continuous process taking place at all levels of society—at the individual level, the family level, the local level, as well as the national level. As witnessed above, however, a very large portion of this investment is at present classified as consumption or, worse, is not considered at all.

Irving H. Siegel, member of the Council of Economic Advisors, joins Schultz in his belief in the importance of an acknowledgement of intangible capital values and national wealth in measures of real output. The inclusion of such things as successful research, education, accumulation of technical know-how and job skills, the adoption of superior production functions and the successful conduct of mineral survey, exploration, and development activities, he holds necessary for any meaningful measure of total output. Dealing in particular with the phase of scientific research in non-physical capital investment, he points out the fact that the large amount of quasi-research activities carried on by small business—as opposed to formal research—and leading to much valuable technical know-how is not included in statistics.[33]

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[32] Ibid., pp. 5-6.

[33] Irving H. Siegel, "Investing in Education & Research," American Economic Review, 50 (May 1960), p. 340-343.

Yet another economist who is today concerned with the concept of human capital is Richard B. Goode, author of the essay "Adding to the Stock of Physical and Human Capital." His comprehensive definition of capital as (1) physical capital, consisting of land, structures, durable equipment, and commodity stocks, and (2) human capital, consisting of knowledge, skills, attitudes, aptitudes, and other acquired traits that contribute to production, I take as my own.

Although both physical and non-physical forms of capital yield a future return at economic cost, the yield of future return to income is not always the chief motivating force prompting investment in man. The difference which Goode counts the most significant between the two--and it is certainly the most obvious--is the fact that human capital is not property under prevailing institutions and can be neither bought nor sold.[34] The truth in this statement--especially the latter part--would, it seems to me, hinge on interpretation of the terms "bought" and "sold." In so far as an individual makes a definite investment in himself for the expressed purpose of gaining some economic skill or knowledge, and then contracts with another to contribute this ability in return for payment, it would seem feasible to look upon this as the sale and purchase of humanly incorporated, hence personally owned, property. Of course, here our path again encounters that of the theologist, and we must retreat to "safer" ground.

In any case, Goode presents an effective account of the role of human capital in advanced economics. In fact, he attributes only 50-60 per cent of the estimated

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[34]Richard B. Goode, "Adding to the Stock of Physical and Human Capital," American Economic Review, 49 (May 1959), p. 149.

rise in output in France, Germany, and the United Kingdom during the 40 years prior to World War I to measured increases in the amounts of labor and physical capital. The other 40-50 per cent of the rise would, in his opinion, best be accounted for by technological advance and human capital, greatly understated in capital formation statistics.

Like Schultz, Goode also stresses the importance of human capital in underdeveloped countries as a prerequisite to successful use of physical capital. Present deficiencies of investment in human capital are reflected in future inadequate supplies of suitable labor, which in turn results in a slow absorptive capacity of physical capital in which past investment has been more than adequate. Until the indispensible nature of human investment in economic growth is fully realized, poor countries are likely to continue to neglect small-scale investment and to concentrate on large-scale projects to increase the stock of physical capital. As long as such a policy is followed, lack of human capital will act as a limiting factor.[35]

Just as Goode stresses the need to equalize the rates of return to investment of physical and non-physical capital in underdeveloped nations, Gary S. Becker points to the importance of an equalization of these two rates in the United States at the present time. Raising the question, "Is there underinvestment in college education?," Becker proceeds to examine the rates of return to education and to capital owned by business, including in the calculations the social cost of college, rather than the private cost, and making adjustments for nonwhites, rurals, and women. In the catagory of business enterprises, he includes both corporate and unincorporated enterprises before

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[35] Ibid., pp. 149-150.

the payment of corporate income tax. Finding a rate of return to investment of between 8 to 9 per cent for both, he draws the rather starling conclusion--startling to the student of human capital at any rate--that there is no justification of a large increase in expenditure on college education relative to expenditures on business capital as indicated by direct returns alone. Any firm judgment about the adequacy of expenditure on college education is prevented by the possibility of indirect or external returns. Becker does suggest that a relatively small expenditure would suffice to meet the need for a particular college specialty.[36]

Becker concerns himself with the importance of student quality in compiling returns to educational investment. His evidence shows a positive correlation between the rate of return to college education and I.Q. level--able persons receiving a greater-than-average direct, as well as indirect, return from college. His studies suggest the importance of a public policy aimed towards correcting imperfections in the "human capital" market and towards increasing the fraction of able persons going to college.[37]

Recently Marshall R. Colberg of Florida State University investigated the topic of human capital as a southern resource. In the publication of his findings, Colberg notes interesting qualities exhibited by this form of capital. For example, he points out the greater geographic mobility of capital invested in the human agent than in either material capital or labor. The divisibility of human capital socially into small units of independent value contriubtes to its greater mobility, while improvements in transportation and communication tend to further the increase of this mobility. Most material capital, on

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[36]Gary S. Becker, "Underinvestment in College Education?," American Economic Review, 50 (May 1960), pp. 346-352.

[37]Ibid., pp. 352-354.

the other hand, is more difficult to move geographically. Colberg also points to the greater personal resources and knowledge of relatively educated persons as human capital's mobility advantage over labor. Though both face the same impediments to mobility, such as fear of the unknown, home-ties, imperfect knowledge of alternate opportunities, and money costs, the obstacles are of less consequence to human capital than to labor.

Considering the nature of human capital movement regionally, Colberg concludes that the stock of human capital maintains a closer geographical balance with the stock of material capital than with ordinary labor. He does not fail to take into account the strong complementarity that exists between such professional persons as teachers, doctors, and social workers, and laborers, but his general observations suggest the existence of a stronger correlation between material capital and immaterial capital. He mentions the trend present in many economic activities of a greater need for human capital as production processes become more automated. It is, to a large degree, through the nation-wide recruiting activities of business firms and federal agencies that the regional balance of human capital stock is kept in balance.[38]

IV: PROBLEMS OF CONCEPTION AND MEASUREMENT

Considering Colberg's treatment of human capital as separate from labor, we arrive at an important problem of definition. Just what things are to be counted as investment in man? What part of a human being is to be properly regarded as capital?

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[38]Marshall R. Colberg, "Human Capital as a Southern Resource" the Southern Economic Journal, 29 (Jan. 1963), pp. 158-161.

How does one in fact determine the point of division between what is and is not capital?

Economists are split in their way of handling this problem. There are those who would encompass almost every constituent of the human being within the term, while there are others who would, like Colberg, consider human capital a factor of production separate from labor. To be sure, Colberg proposes "a rough division of all employed persons according to whether their services are largely those of immaterial capital or those of labor...by including in the former all professional and technical workers and all non-farm managers, officials and proprietors while classifying all other employed persons as laborers."[39]

This problem of conception is not new. To be sure, like modern writers on the subject, past economists who accepted the concept of man as capital differed over those things to be regarded as investment. Thorstein Veblen, for instance, took the position that all of man should be encompassed by the term. In The Place of Science in Modern Civilization, he speaks of "material equipment" and "immaterial equipment," the material equipment consisting of capital made by the "immaterial equipment" and also used by it. This "immaterial equipment" is the total stock of knowledge, technology, ability, and skill possessed by the community as a whole over successive generations. In this theory, the "common laborer" becomes a highly trained workman, whose technological competency is equal to serviceability. It is only in the hands of these "bearers of the immaterial" that physical goods owned by the capitalist become "means of production."

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[39]Ibid., p. 160.

Since all tangible assets owe their productivity and value to the immaterial industrial expedients which they employ, and since these immaterial industrial expedients are a product of the community's past and present life, it follows logically that these two elements in production are forever and inextricably bound.[40] Indeed, in Veblen's words, "the brute force of man is, of course, an indespensible factor in industry, but it is senseless to ask how much of the product of industry is to be imputed to these brute forces."[41]

There are others today who would attempt to distinguish within the individual between the fine and perhaps imperceptible line separating brute forces from acquired ability. According to this point of view, human capital is that part of an individual's capabilities which exists due to some investment in himself, while labor is that part of the person's abilities used to put to work the human capital. In other words, the force required is labor and that upon which the force is exerted is capital.

In the attempt to distinguish between labor and capital within the person, one faces thorny problems of conception and measurement. Should child-rearing, food, and shelter be counted as investment in man? If so, should these items be divided into separate catagories, one part contributing to capital formation, another part supporting the labor, and yet another part going towards mere consumption and thereby contributing to the formation of neither labor or capital. There are, indeed, difficulties of imputation and allocation of costs. Just how does one distinguish within the individual between expenditures

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[40]Thorstein Veblen, "On the Nature of Capital," The Place of Science in Modern Civilization (New York, 1919), pp. 325-334.

[41]Ibid., p. 349.

for consumption and for investment? In attempting to measure human capital does one take the individual as he exists at the moment, test him as to his possessed abilities, skills, and knowledge and then impose a value upon this "capital" according to the way in which it is employed? Or, on the contrary, must one consider all that has gone into the person in question since his birth, deciding which inputs contribute to the formation of capital and by summing the costs of these inputs, determine the amount of capital inherent in the individual?

Humans are endowed fairly equally with the ability to do labor, taken with its usual connotation as a human capacity to do manual work requiring little knowledge or skill. Hence, a measure of this economic factor can be approximated merely by counting the number of all of a nation's normal individuals. But, as Schultz points out, such a measure would obviously have little meaning since any inequality in capacity resulting from training and education would have been discounted entirely.

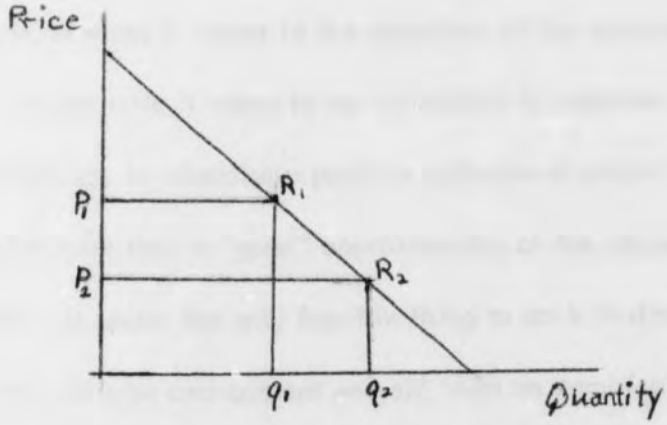
Schultz goes on to suggest alternative methods of measuring human investment. One might, for instance, follow the practice used in connection with physical capital goods by measuring expenditures made to produce the goods and, on the basis of this measurement, forming an estimate of the magnitude of capital formation. However, the difficult problem of distinguishing between expenditures for investment and for consumption arises in this case. The formidable task of identifying each component makes the measurement of capital formation by expenditure less useful for human investment than for investment in physical goods. Furthermore, when capital goods are valuated at cost, the demand for the good and the prospective efficiency of operation are disregarded. The other method which Schultz offers for estimating human investment is by

measuring its yield instead of its cost. The increase in earnings as set by the market place is the yield on the investment.[42]

Asserting that the difference in difficulty of compiling estimates of the two kinds of capital is overly exaggerated, Richard B. Goode proposes the valuation of both types of investment by discounting the expected future income.[43] However, employment of this method involves making assumptions about the demand curve which are not necessarily justifiable, and its acceptibility is for this reason questionable.

In fact, any measure of the quantity of human capital by its value, i.e, by its "dollar volume," proves unsatisfactory for problem solving. Though this method might appear natural and appropriate, serious shortcomings are apparent upon closer examination.

FIGURE 1.



When demand is at point R, on the demand curve in Figure 1, the value of capital is greatest. Now suppose the price of capital falls to P_2 and the Quantity demanded increases to q_2. The inelasticity of this portion of the demand curve has, however,

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[42]Schultz, "Investment in Human Capital," pp. 7-8.

[43]Goode, op. cit., p. 148.

resulted in a decrease in value. Thus on the one hand, quantity of capital has increased, while on the other hand, the dollar value of capital has decreased.

Added to this problem is the "index-number" problem which arises from the heterogeneous composition of capital. In measuring capital a single unit of measurement is used for different kinds of things. Such measurement is in truth no more valid than the practice of adding apples to oranges.[44]

It seems to me a further difficulty in valuation would arise from the innately nebulous quality of human capital. By discounting the expected future income, might not one grossly neglect an important "product" of human capital which might in fact receive no income in the immediate future? The "product" of which I speak is the thoughts of a human brain well-trained and disciplined through time and monetary expenditures on education. Just where may the line be drawn in deciding what is production when it comes to the operation of the human brain?

In any case it seems to me impossible to separate labor from capital within the human being, to establish a positive criterion of which human capital will consist, or to hope for more than a "good" approximation of the value of this thing called human capital. It seems the only feasible thing to do is to dismiss the idea of any kind of realistic division and content oneself with an empirically meaningful theoretical division for the sake of analysis.

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[44] Landmarks in Political Economy, ed. E. J. Hamilton, Rees, Johnson (Chicago, 1962), pp. 538-541.

V. RELATIONS BETWEEN HUMAN CAPITAL, INCOME, AND RACE

It remains to provide an empirical indication of the meaningfulness of the concept of human capital in an analysis of an aspect of economic pluralism in the United States.

It is said that a plural economy exists today in the United States; that is, that there are different factor markets for a single factor, based on race. According to this argument, the lower returns to workers of the Negro race are a result of racially separate factor markets. If social discrimination were wiped out, then there would be one factor market; hence, equality of returns to the labor factor.

A study of the investment in human capital suggests, however, that there might not in truth exist a plural economy in the United States, and that this inequality of returns to factors stems not from race. Rather, the argument seems plausible that only one factor market for labor exists, but that the levels within this market are influenced by human capital. The disparity in factor returns results then from a difference of investment in man along racial lines.

In the remaining portion of the paper, I conduct an empirical study among the states in the attempt to determine something of the relationships between investment in human capital, race, and income. From the relationships established, I aim to show that it is in truth underinvestment in members of the Negro race which accounts to a large extent for their "economic inferiority."

A. Correlation of Differences in Income and Differences In Education, Based on Race

A preliminary investigation indicates that differences in the income of whites and Negro are largely accounted for by the rather large differences in education levels of the two races.

An inspection of Table 1 reveals that in the case of every state in the union there exists a disparity between median incomes for white and nonwhite males. This difference ranges from $567 for the state of Iowa to the large amount of $2,889 in Wyoming. Even Hawaii, the true "melting pot" of races and nationalities, ranks 4th in order of increasing size of difference, exhibiting a difference of $901. The rather large differences between state white and nonwhite median incomes seems to indicate a pluralistic economy.

When, however, these differences in median income are paired with the differences in median number of school years completed by white and nonwhite persons 25 years and older, a rather high degree of correlation is found. An especially close concordance of the two variables is found in certain states. Connecticut, for instance, ranks 26th in income difference and 22nd in education difference. Similarly, Missouri, Tennessee, Louisiana, Texas, Colorado, Oregon, and Alaska possess almost identical ranks for both of the variables.

The over-all correlation coefficient of +.681 indicates that 68 per cent of the variation in the differences in median incomes of white and nonwhite workers may be explained in terms of the variation in the differences in median number of school years completed. It is therefore apparent that the fewer number of years of school completed by nonwhites accounts to large extent for the fewer number of dollars received as median income. Given 51 observations, a rank correlation coefficient of +.681 must be regarded as highly significant, i.e., it is highly improbable that there is no correlation.

B. Correlation of Per Capita Public Expenditures for Education with White and Nonwhite Median Incomes and White and Nonwhite State Population Percentages

Since it has been found that variation in the differences in income levels is determined to a considerable degree by variation in the differences in educational levels

TABLE 1

CORRELATION OF THE DIFFERENCE IN MEDIAN INCOME AND THE DIFFERENCE IN MEDIAN SCHOOL YEARS COMPLETED, BY STATE, ON THE BASIS OF RACE
1959, 1960
(RANKS ARE IN PARENTHESES)

STATES	VARIABLES CORRELATED	
	Difference between white and nonwhite median income (dollars)	Difference between white and nonwhite median school years completed (years)
Maine	1,305 (13)	.3 (2)
New Hampshire	1,353 (18)	-.8 (1)
Vermont	1,291 (12)	.4 (12)
Massachusetts	1,042 (6)	1.3 (11)
Rhode Island	1,345 (17)	.5 (5.5)
Connecticut	1,517 (26)	2.0 (25.5)
New York	1,491 (24)	1.4 (13)
New Jersey	1,831 (35)	2.0 (25.5)
Pennsylvania	1,132 (8)	1.4 (13)
Ohio	1,470 (23)	1.9 (22)
Indiana	1,008 (5)	1.9 (22)
Illinois	1,443 (21)	1.7 (18)
Michigan	1,256 (10)	1.9 (22)
Wisconsin	786 (3)	1.4 (13)
Minnesota	1,396 (20)	.9 (8)
Iowa	567 (1)	1.8 (19)
Missouri	1,281 (11)	1.1 (10)
North Dakota	1,718 (30)	.9 (8)
South Dakota	2,079 (42)	1.9 (22)
Nebraska	615 (2)	2.1 (28)
Kansas	1,332 (15)	2.2 (30.5)
Delaware	2,458 (48)	3.2 (40)
Maryland	2,119 (44)	2.9 (37)
Dist. of Columbia	1,322 (14)	2.6 (33)
Virginia	1,828 (34)	3.6 (42)
West Virginia	1,373 (19)	.4 (3.5)
North Carolina	1,749 (31)	2.8 (35.5)

TABLE 1

South Carolina	2,060 (41)	4.4 (45.5)
Georgia	1,885 (38)	4.2 (44)
Florida	1,670 (28)	4.6 (48)
Kentucky	1,164 (9)	.5 (5.5)
Tennessee	1,334 (16)	1.5 (15)
Alabama	1,950 (40)	3.7 (43)
Mississippi	1,867 (37)	5.0 (50)
Arkansas	1,493 (25)	3.0 (38.5)
Louisiana	2,436 (47)	4.5 (47)
Oklahoma	1,833 (36)	2.1 (28)
Texas	1,811 (32)	2.7 (34)
Montana	2,532 (49)	3.0 (38.5)
Idaho	2,359 (45)	2.2 (30.5)
Wyoming	2,889 (51)	2.8 (35.5)
Colorado	1,065 (7)	.9 (8)
New Mexico	2, 092 (43)	4.4 (45.5)
Arizona	2,417 (46)	4.7 (49)
Utah	1,819 (33)	2.1 (28)
Nevada	1,892 (39)	3.4 (41)
Washington	1,700 (29)	1.6 (16.5)
Oregon	1,451 (22)	1.9 (22)
California	1,594 (27)	1.6 (16.5)
Alaska	2,865 (50)	5.8 (51)
Hawaii	901 (4)	2.5 (32)
Spearman's Rank Correlation Coefficient*	+.681**	

Source: Income and educational differences were found by subtracting the median income of nonwhite males from the median income of white males as given on p. 289 of the 1960 United States Census of Population- Summary: General Social and Economic Characteristics, and by subtracting the median school years of nonwhites 25 years and older from the median school years of whites 25 years and older, as given in Table 115 of the 1963 Statistical Abstract of the United States.

Notes: Income figures are for "adult males," while number of school years completed are given for both male and females 25 years and over.

*To avoid the problems arising from possible non-normality of the populations from which the data was taken, a nonparametric method of measuring the relation between variables was used. Use of Spearman's coefficient of rank correlation involves no assumptions about the population parameters, and the laborious computations of the general method for correlating two variables is avoided.

TABLE 1

Notes: (continued)

The first step in correlation by the Spearman method is to order observations by size and to establish ranks on the basis of size. The general degree of correlation may then be ascertained by inspecting the degree of concordance between the two rankings. It is necessary, however, for a precise measure of this relationship to employ Spearman's coefficient:

$$r_{rank} = 1 - \frac{6\ Ed^2}{N(N^2-1)}$$

Nor Here "d" is the difference in rank between paired items in the two series, and N is the number of items in the series. A useful check on the accuracy of the subtractions is the fact that the sum of positive differences should equal the sum of negative differences. If two or more items in the series happen to have the same value and are therefore tied in rank, the positions should be split among the different items. Thus, if three states had the same median income and this value was due the fourth rank in the series, the rank of each of the three states would be $5 = \frac{4+5+6}{3}$.

The coefficient obtained by use of the formula $1 - \frac{6\ Ed^2}{N(N^2-1)}$ will be +1 if the rankings of the states based on the two variables are the same throughout. If, however, the relation of the variables is exactly inverse, r_{rank} will be -1. The range of the coefficient of correlation is then -1 to +1, with 0 indicating no relation between the two rankings.

Because all information concerning the data is not utilized, the rank method is not as accurate as the ordinary method. With the conventional correlation coefficient, the adjacent actual values differ from each other by a constant amount. In a ranked series, however, the first differences of the values of the items arranged in order of magnitude are almost never constant. Were this difference constant, r_{rank} would usually correspond exactly to r computed from the values underlying the ranks.

Pearson has postulated a correction factor applicable to r_{rank} to make it equal to r. This correction always increases the correlation by a small amount, but is suitable only if the values are distributed normally. Since the correction changes the correlation by so slight degree and always in a positive direction, and since the correction factor is not always appropriate to apply, it is omitted in my computations.

In attempting to determine if a given coefficient provides evidence of a significant degree of correlation between paired variables, problems are encountered. When N is large and the samples are drawn from a universe for which the coefficients are normally distributed, and when there are no ties in the ranking of either variables, $S_{r_{rank}} = \frac{1}{N-1}$ may be employed to find the standard deviation of the distribution of r_{rank}'s. This may then be used in testing the null hypothesis that r_{rank} is not significant.

However, the distribution of r_{rank} for small samples drawn from uncorrelated parent populations is not known. Furthermore, the distributions of r_{rank} for samples taken from correlated parent populations has not been established. For these reasons there are important areas of indeterminacy in making inferences based upon the Spearman coefficient. Such inadequacies should be borne in mind by the reader when considering the rank correlation coefficients herein presented.*'

** Given 51 observations, a rank correlation coefficient of +.681 must be regarded as highly significant, i.e., it is highly improbable that there is no correlation.

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*'F. E. Croxton and D. J. Cowden, Practical Business Statistics, (Prentice Hall, Inc., N. J., 1959), pp. 422-424.

F. E. Croxton and D. J. Cowden, Applied General Statistics (Prentice Hall, Inc., N. J., 1960), pp. 478-480.

F. C. Mills, Statistical Methods (New York, 1955), pp. 315-316.

it is logical to assume that the direct correlation of educational expenditures and median incomes will yield significantly positive results. If a relationship is established, there exists the further question if the correlation between median incomes and educational expenditures is similar for both races.

By correlating the current per capita expenditures for community services, summer schools, community colleges, and adult education with the median income variables of both white and Negro, on the one hand, with percentages of total state population that are white and Negro, on the other hand, further information useful in establishing the relationships between race, income, and human capital investment is found.

The rank correlation coefficient computed for the median income of white males and the current per capita public expenditures on education is +.493. This is a relatively high coefficient and indicates a rather close connection between the income of white males and the level of expenditures for community services, summer schools, community colleges and adult education. In other words, there appears a tendency for states with a greater per capita expenditure for those educational services mentioned to also have a higher median income.

An even closer degree of relationship is found to exist between these expenditures and the median incomes of nonwhite males; the correlation coefficient being in this case +.680. There seem two possible explanations for this higher relationship, depending upon the point of view taken by the observer. The view that best supports the purpose of this paper is that the higher expenditures are felt more strongly in the Negro segment of the population than in the white, due to the greater need by Negroes of such facilities of community services and adult education. Probably the sounder

explanation for this higher coefficient is, however, that those states having a high nonwhite median income tend generally to have also a higher white median income. Those states with higher median incomes are likely to be able to afford larger expenditures for such things as summer schools, community services and colleges, and adult education.

The relation found to exist between the percentage of Negro population of a state and its per capita expenditures for these educational services is +.355. Though this coefficient is smaller than those found previously, it remains statistically significant. The fact that it is larger than the corresponding coefficient of the white percentage of total state population and per capita expenditures suggests that the outlays for such educational services are greater in states with a larger percentage of Negro population. Once again, this could be explained in terms of the greater need of states with a high percentage of Negroes for means by which to improve the condition of these people. No doubt, the large expenditure is due largely to recent political agitation by this minority group. In any case, it seems apparent that the Negro segment of the population exerts more weight in determining the level of expenditures than does the white segment.

On the other hand, the degree of correlation between the percentage of state population that is white and the current per capita expenditures for educational services is so slight as to be statistically insignificant. We can therefore accept the hypothesis that there is no correlation between the percentage of population, white, and public per capita expenditures for community services and colleges, summer schools, and adult education.

BLE II

CORRELATION OF WHITE MEDIAN INCOME, NONWHITE MEDIAN INCOME, NEGRO PERCENTAGE OF STATE POPULATION AND WHITE PERCENTAGE OF POPULATION, EACH WITH THE CURRENT PER CAPITA PUBLIC EXPENDITURES FOR COMMUNITY SERVICES, SUMMER SCHOOLS, COMMUNITY COLLEGES, AND ADULT EDUCATION, BY STATES

(RANKS ARE IN PARENTHESES) 1959, 1960

STATES	VARIABLES CORRELATED WITH CURRENT PER CAPITA EXPENDITURES FOR EDUCATIONAL SERVICES				CURRENT PER CAPITA PUBLIC EXPENDITURES FOR EDUCATIONAL SERVICES
	Median Income of nonwhite males (dollars)	Median Income of white males (dollars)	Negro Percentage of Total state population	White Percentage of total state population	(dollars)
ne	3 275 (39)	1 970 (31)	.34% (42)	99.66% (6)	.14 (40)
w Hampshire	3 845 (27)	2 492 (25)	.31% (43)	99.69% (5)	.08 (46)
rmont	3 320 (38)	2 029 (29)	.13% (46)	99.87% (2)	.14 (40)
ssachusetts	4 422 (16)	3 380 (17)	2.2 % (35)	97.8 % (13)	.42 (27)
ode Island	3 848 (26)	2 503 (24)	2.1 % (36.5)	97.9 % (36.5)	.19 (36.5)
nnecticut	5 033 (5)	3 516 (5)	4.2 % (31.5)	95.8 % (1615)	.51 (20)
w York	4 798 (10)	3 307 (11)	8.4 % (21)	91.6 % (27)	1.31 (8)
w Jersey	5 172 (1)	3 341 (9)	8.5 % (20)	91.5 % (28)	.58 (18.5)
nsylvania	4,348 (18)	3,216 (12)	7.5 % (23)	92.5 % (25)	.50 (21)
io	4 903 (7)	3 433 (8)	8.1 % (22)	91.9 % (26)	.43 (25.5)
diana	4 456 (15)	3 448 (7)	5.7 % (27)	94.3 % (21)	.46 (23)
linois	5 056 (4)	3 613 (4)	10.2 % (16)	89.8 % (32)	.21 (35)
chigan	4 984 (6)	3 728 (2)	9.1 % (17.5)	90.9 % (30.5)	1.55 (7)
sconsin	4,417 (17)	3 631 (3)	1.9 % (38)	98.1 % (10)	.33 (30)
nnesota	4 012 (21)	2 616 (22)	6.5 % (25.5)	93.5 % (22.5)	1.24 (10)
wa	3 708 (31)	3 141 (15)	9.1 % (17.5)	90.9 % (30.5)	.61 (17)
ssouri	3 851 (25)	2 570 (23)	9.0 % (19)	91.0 % (29)	.58 (18.5)
rth Dakota	3 134 (41)	1 416 (42)	.12% (47)	99.88% (1)	.11 (43)
uth Dakota	3 043 (42)	964 (46)	.16% (45)	99.84% (3)	.07 (47)
braska	3 497 (33)	2 882 (18)	2.1 % (36.5)	97.9 % (11.5)	.68 (15)
nsas	3 968 (24)	2 636 (21)	4.2 % (31.5)	95.8 % (16.5)	2.77 (1)
laware	4 879 (8)	2 421 (26)	13.6 % (14)	86.4 % (34)	.09 (44.5)
ryland	4 875 (9)	2 756 (19)	16.7 % (12)	83.3 % (36)	1.03 (11)
st. of Columbia	4 655 (13)	3 333 (10)	53.0 % (1)	47.0 % (47)	1.72 (5)
rginia	3 734 (29)	1 906 (33)	20.6 % (9)	79.4 % (39)	.44 (24)
st Virginia	3 470 (34)	2 097 (27)	4.8 % (29)	95.2 % (19)	.36 (28)
rth Carolina	3 035 (43)	1 286 (43)	24.5 % (7)	75.5 % (41)	.25 (34)

ith Carolina	3 195 (40)	1 135 (44)	34.5 % (3)	65.5 % (45)	.43 (25.5)
orgia	3 374 (36)	1 489 (39)	28.5 % (6)	61.5 % (42)	.67 (16)
orida	3 743 (28)	2 073 (28)	17.8 % (11)	82.2 % (37)	.93 (12)
ntucky	2 928 (45)	1 764 (35)	7.1 % (24)	92.9 % (24)	.33 (30)
nnessee	2 932 (44)	1 598 (37)	16.5 % (13)	83.5 % (35)	.16 (38)
abama	3 367 (37)	1 417 (41)	30.0 % (5)	70.0 % (43)	.09 (44.5)
ssissippi	2,757 (46)	890 (47)	42.0 % (2)	58.0 % (46)	1.89 (4)
kansas	2 486 (47)	993 (45)	21.8 % (8)	78.2 % (40)	.14 (40)
uisiana	4 001 (22)	1 565 (38)	31.9 % (4)	68.1 % (44)	.85 (14)
lahoma	3 446 (35)	1 613 (36)	6.5 % (25.5)	93.5 % (22.5)	.19 (36.5)
xas	3 728 (30)	1 917 (32)	12.4 % (15)	87.6 % (33)	.27 (32.5)
ntana	3,993 (23)	1 461 (40)	.22% (44)	99.78% (4)	.27 (32.5)
aho	4 345	1 986	.23%	99.77%	*1
oming	4 866	1 977	.66%	99.35%	
lorado	4 228 (19)	3 163 (14)	2 .3 % (34)	97.7 % (14)	1.66 (6)
w Mexico	4 101 (20)	2 009 (30)	17.9 % (10)	32.1 % (38)	.33 (30)
zona	4 262	1 845	3.3 %	96.7 %	
ah	4 558 (14)	2 739 (20)	.47% (41)	99.53% (7)	.88 (13)
vada	5 076 (3)	3 184 (13)	4.7 % (30)	95.3 % (18)	.48 (22)
shington	4 689 (12)	2 989 (16)	1.7 % (39)	98.3 % (9)	2.20 L2)
egon	4 470	3 019	1.0 %	99.0 %	*2
California	5 109 (2)	3 515 (6)	5.6 % (28)	94.4 % (20)	1.26 (9)
Alaska	4 696 (11)	1 831 (34)	3.0 % (33)	97.0 % (15)	.13 (42)
waii	3 649 (32)	3 748 (1)	.78% (40)	99.22% (8)	1.99 (3)
earman's Rank Correlation Coefficient	+.493	+.680	+.081	+.355	

Sources: Median income data were taken from p. 289 of the 1960 United States Census of Population- Summary: General Social and Economic Characteristics.

Population percentages were obtained by dividing the number of Negroes in each state by the respective total number of people. To find the percentage of whites in each state, I subtracted the Negro percentage from 100%, disregarding the negligible percentage comprised of other races. The population figures were taken from p. 30 of the 1963 Statistical Abstract.

Notes: Because the initial information on expenditures was not available for Idaho, Wyoming, Arizona, and Oregon, these states are omitted in the ranks of all the variables. In this case, therefore, ranks run only from 1 to 46, and the four states mentioned are excluded from the calculation of the rank correlation coefficient.

The figure given as the current per capita expenditure for community services, summer schools, etc. in the state of California is inaccurate. In this case, expenditures for summer schools, adult education, and community colleges are not shown separately, but are included with elementary and secondary schools.

C. Derivation of an Index of Investment in Human Capital

In order to find more about the various relationships of income, race, and human capital, an index of investment in human capital was established with which to correlate other variables. This index of investment in human capital was obtained by the summing of ranks of nine separate factors and the ranking of the sum of the ranks for each state.

First of all, from figure 1 (p.110) of the 1963 Statistical Abstract was taken the current expenditures per pupil in average daily attendance of public elementary and secondary day schools by states. These per-pupil-expenditures were ranked from large to small.

Then the per capita values from the current expenditures for community services, summer schools, community colleges, and adult education were computed and ranked on the basis of decreasing magnitude.

The percentage figures of pupils enrolled attending daily were taken from Table 166, 1963 Statistical Abstract. These figures were ranked according to decreasing value.

From the same source book, Table 171, was obtained the pupil-teacher ratio for each state. Because a small average enrollment per classroom teacher is considered most desirable, this variable was ranked in order of ascending size--opposite to the order used in ranking the other variables. The purpose in this was to make the ranks compatible.

The fifth component item in the index of investment is the average salary in dollars of instructional staff. These values, taken from Table 167, Statistical Abstract, are ranked from large to small. The figure given for Massachusetts includes clerks, and for Illinois, administrators.

The figures by states for total federal funds allotted for education were found and divided by the respective state population numbers to obtain the per capita federal funds allotted for education. In this instance, the variables were again ranked on the basis of decreasing magnitude.

Since only the totals were given on page 139, Statistical Abstract, for the value of plant and plant funds of institutions of higher learning, it was necessary to divide by the total state populations in order to find the per capita values by states. The ranks range from large to small.

The eighth and ninth variables are concerned with public welfare assistance. From Table 412, Statistical Abstract, were taken the amounts of public aid to dependent children per recipient by states and ranked, beginning with the state providing greatest aid per dependent child and proceeding through to the lowest. The final component of the index of investment in human capital was taken from the same table and shows the general public assistance per case.

After the ranks of these nine variables were summed for each state, the rank sums were ranked in order of decreasing size, constituting an index of capital investment for use in the following computation of correlation coefficients.

D. Correlation of Median Incomes of Whites and Nonwhites, and the Percentage of Total State Population that is Negro with the Index of Investment in Human Capital, by State

The coefficient found when the median incomes of white and nonwhite males 25 years and over was correlated with the index of investment is quite surprising. As may be seen in Table IV, an actual inverse relation exists between the two, those states having a higher index of investment tending to have a lower median income. Since the coefficients

TABLE III

INDEX OF INVESTMENT IN HUMAN CAPITAL: D

STATES	current expenditures/ pupil in average daily attend. public elem. and secondary (dollars)	current per capita expenditures for educational services (dollars)	% of pupils enrolled attending daily	pupil/ teacher ratio	s in (
Maine	283 (41)	.14 (40)	93.2 (5)	17.0 (1)	3,
New Hampshire	347 (30.5)	.08 (46)	90.3 (21)	20.6 (11.5)	4,
Vermont	344 (32.5)	.14 (40)	96.4 (2)	19.2 (7)	4,
Massachusetts	409 (18.5)	.42 (27)	92.2 (7.5)	21.9 (24)	5,
Rhode Island	413 (15.5)	.19 (36.5)	88.3 (33.5)	21.5 (22)	5,
Connecticut	436 (8)	.51 (20)	89.1 (31)	21.1 (17.5)	6,
New York	562 (1)	1.31 (8)	87.1 (42.5)	21.1 (17.5)	6,
New Jersey	488 (3)	.58 (18.5)	89.7 (27)	20.9 (13.5)	5,
Pennsylvania	409 (18.5)	.50 (21)	92.8 (6)	23.1 (33.5)	5,
Ohio	365 (27)	.43 (25.5)	91.0 (14)	23.5 (33.5)	5,
Illinois	438 (7)	.21 (35)	84.7 (50)	21.8 (23)	5,
Indiana	369 (24)	.46 (23)	87.2 (41)	22.9 (28.5)	5,
Michigan	415 (14)	1.55 (7)	89.7 (27)	24.3 (39)	5,
Wisconsin	413 (15.5)	.33 (30)	88.3 (33.5)	22.2 (26)	4,
Minnesota	425 (11)	1.24 (10)	92.0 (10.5)	21.2 (19)	5,
Iowa	368 (25)	.61 (17)	89.9 (24)	18.8 (6)	4,
Missouri	344 (32.5)	.58 (18.5)	85.9 (46)	21.3 (20)	4,
North Dakota	367 (26)	.11 (43)	92.2 (7.5)	19.6 (8)	3,
South Dakota	347 (30.5)	.07 (47)	89.9 (24)	18.1 (2.5)	3,
Nebraska	337 (34)	.68 (15)	92.0 (10.5)	18.1 (2.5)	3,
Kansas	348 (29)	2.77 (1)	92.1 (9)	18.3 (4.5)	4,

3 (11)	13.58 (16)	95.95 (10)	80.31 (7)	38.86 (13)	114 (51)
5 (16)	22.58 (5)	95.01 (11)	61.47 (17)	38.04 (14)	150 (44)
0 (2)	10.66 (26)	87.09 (20)	57.88 (22)	44.15 (7)	142 (46)
9 (1)	64.96 (1)	53.61 (46)	60.26 (20)	34.13 (21)	191 (35)
0 (18)	13.70 (15)	42.29 (50)	68.72 (15)	34.78 (20)	211 (30)

0.

puted or not available for the states of Idaho, Wyoming, Arizona, and
ther 47 states, computed to be 24.
and Idaho. The mean of the ranks of the remaining 43 states is used.

TABLE III

INDEX OF INVESTMENT IN HUMAN CAPITAL: DERIVATION FROM THE RANKS OF NINE VARIABLES, 1959, 1960

STATES	current expenditures/ pupil in average daily attend. public elem. and secondary (dollars)	current per capita expenditures for educational services (dollars)	% of pupils enrolled attending daily	pupil/ teacher ratio	average salary of instructional staff (dollars)	per capita federal funds allotted for education (dollars)	per capita value of plant and plant funds of institutions of higher education (dollars)	general public assistance per case (dollars)	public aid to dependent children per recipient (dollars)	total of ranks and rank of sums
Maine	283 (41)	.14 (40)	93.2 (5)	17.0 (1)	3,694 (47)	10.71 (25)	66.39 (39)	51.60 (29)	29.64 (31)	258 (14)
New Hampshire	347 (30.5)	.08 (46)	90.3 (21)	20.6 (11.5)	4,455 (33)	9.68 (35)	------ (16)	-----*-(22.9)	39.75 (11)	226.9 (24)
Vermont	344 (32.5)	.14 (40)	96.4 (2)	19.2 (7)	4,466 (32)	10.08 (33)	114.47 (4)	------ (22.9)	30.20 (30)	203.4 (32)
Massachusetts	409 (18.5)	.42 (27)	92.2 (7.5)	21.9 (24)	5,545*(14)	10.37 (31)	127.61 (2)	70.08 (13)	49.30 (1)	138 (48)
Rhode Island	413 (15.5)	.19 (36.5)	88.3 (33.5)	21.5 (22)	5,499 (17)	10.56 (27)	93.73 (14)	53.66 (25)	39.36 (12)	202.5 (33)
Connecticut	436 (8)	.51 (20)	89.1 (31)	21.1 (17.5)	6,008 (5)	7.59 (44)	116.48 (3)	73.30 (11)	46.78 (5)	144.5 (45)
New York	562 (1)	1.31 (8)	87.1 (42.5)	21.1 (17.5)	6,537 (3)	7.15 (47)	83.67 (21)	79.53 (9)	42. 00 (8)	157 (43)
New Jersey	488 (3)	.58 (18.5)	89.7 (27)	20.9 (13.5)	5,871 (6)	4.88 (51)	52.98 (47)	115.32 (1)	47.49 (4)	171 (41)
Pennsylvania	409 (18.5)	.50 (21)	92.8 (6)	23.1 (31.5)	5,308 (20)	6.70 (48)	71.05 (36)	60.37 (19)	28.85 (35)	235 (22)
Ohio	365 (27)	.43 (25.5)	91.0 (14)	23.5 (33.5)	5,124 (22)	5.91 (50)	65.08 (40)	80.13 (8)	31.93 (25)	245 (16.5)
Illinois	438 (7)	.21 (35)	84.7 (50)	21.8 (23)	5,814 (7)	6.56 (49)	73.48 (30)	-------(22.9)	44.20 (6)	229.9 (23)
Indiana	369 (24)	.46 (23)	87.2 (41)	22.9 (28.5)	5,542 (15)	7.38 (46)	105.36 (6)	-------(22.9)	28.74 (36)	242.4 (20)
Michigan	415 (14)	1.55 (7)	89.7 (27)	24.3 (39)	5,654 (10)	7.46 (45)	94.13 (12)	102.93 (2)	37.09 (16)	172 (40)
Wisconsin	413 (15.5)	..33 (30)	88.3 (33.5)	22.2 (26)	4,870 (28)	8.67 (42)	64.86 (41)	91.07 (3)	49.08 (2)	221 (28)
Minnesota	425 (11)	1.24 (10)	92.0 (10.5)	21.2 (19)	5,275 (21)	9.58 (36)	92.81 (15)	81.78 (5)	49.03 (3)	130.5 (49)
Iowa	368 (25)	.61 (17)	89.9 (24)	18.8 (6)	4,030 (39)	9.70 (34)	80.54 (22)	-------(22.9)	37.05 (17)	206.9 (31)
Missouri	344 (32.5)	.58 (18.5)	85.9 (46)	21.3 (20)	4,536 (31)	9.03 (40)	80.16 (23)	56.75 (23)	24.29 (39.5)	273.5 (13)
North Dakota	367 (26)	.11 (43)	92.2 (7.5)	19.6 (8)	3,695 (46)	14.37 (14)	105.87 (5)	59.59 (21)	40.47 (10)	180.5 (37)
South Dakota	347 (30.5)	.07 (47)	89.9 (24)	18.1 (2.5)	3,725 (45)	16.37 (7)	78.29 (24)	35.63 (34)	30.69 (29)	243 (19)
Nebraska	337 (34)	.68 (15)	92.0 (10.5)	18.1 (2.5)	3,876 (44)	10.91 (23)	94.07 (13)	53.30 (26)	29.22 (33)	201 (34)
Kansas	348 (29)	2.77 (1)	92.1 (9)	18.3 (4.5)	4,450 (34)	10.38 (30)	97.12 (9)	69.71 (14)	36.92 (8)	138.5 (47)

TABLE III

Delaware	456 (4)	.09 (44.5)	90.7 (19)	20.6 (11.5)	5,800 (8)	8.12 (43)	71.36 (33)	52.27 (28)	29.10 (34)	225 (26)
Maryland	393 (22)	1.03 (11)	89.5 (29)	24.5 (41.5)	5,557 (13)	9.16 (39)	73.84 (29)	70.32 (12)	31.49 (27)	223.5 (27)
Dist. of Columbia	431 (9)	1.72 (5)	86.4 (45)	20.9 (13.5)	6,280 (4)	33.71 (3)	23.79 (51)	75.49 (10)	32.68 (23)	163.5 (42)
Virginia	274 (42)	.44 (24)	89.9 (24)	22.3 (27)	4,312 (36)	12.15 (20)	62.84 (42)	45.19 (31)	23.55 (41)	287 (12)
West Virginia	258 (43)	.36 (28)	91.3 (13)	26.5 (49)	3,952 (41)	9.25 (38)	71.22 (34)	31.71 (35)	25.06 (38)	319 (8)
North Carolina	237 (47)	.25 (34)	90.8 (17)	25.5 (48)	4,178 (38)	10.42 (29)	88.52 (19)	23.61 (39)	22.25 (44)	315 (9)
South Carolina	220 (50)	.43 (25.5)	87.1 (42.5)	25.4 (46)	3,450 (48)	11.88 (21)	74.91 (28)	31.11 (36)	16.27 (49)	346 (3)
Georgia	253 (44)	.67 (16)	86.5 (44)	24.5 (41.5)	3,904 (43)	12.85 (17)	59.09 (43)	31.03 (37)	23.19 (43)	328.5 (7)
Florida	318 (38)	.93 (12)	87.6 (39.5)	24.4 (40)	5,080 (24)	10.15 (32)	50.52 (48)	-------(22.9)	16.51 (48)	304.4 (10)
Kentucky	233 (48)	.33 (30)	89.7 (27)	23.6 (35.5)	3,327 (49)	9.41 (37)	72.39 (32)	24.83 (38)	24.29 (39.5)	336 (6)
Tennessee	238 (46)	.16 (38)	90.8 (17)	26.7 (50)	3,929 (42)	10.90 (24)	66.51 (38)	18.91 (40)	18.56 (46)	341 (5)
Alabama	241 (45)	.09 (44.5)	90.1 (22)	25.4 (46)	4,002 (40)	14.32 (12.5)	45.53 (49)	12.46 (44)	11.69 (50)	353 (2)
Mississippi	206 (51)	1.89 (4)	85.8 (47)	23.7 (37)	3,314 (50)	12.20 (19)	58.88 (44)	14.96 (42)	9.05 (51)	345 (4)
Arkansas	225 (49)	.14 (40)	87.8 (36)	25.4 (46)	3,295 (51)	11.72 (22)	58.56 (45)	15.44 (41)	17.65 (47)	377 (1)
Louisiana	372 (23)	.85 (14)	89.4 (30)	23.1 (31.5)	4,978 (26)	10.45 (28)	77.72 (25)	52.47 (27)	23.42 (42)	246.5 (15)
Oklahoma	311 (39)	.19 (36.5)	90.9 (15)	23.0 (30)	4,659 (30)	14.95 (9)	88.85 (18)	12.68 (43)	32.08 (24)	244.5 (18)
Texas	332 (35)	.27 (32.5)	88.1 (35)	21.4 (21)	4,708 (29)	9.01 (41)	76.08 (26)	-------(22.9)	18.90 (45)	287.4 (11)
Montana	411 (17)	.27 (32.5)	90.8 (17)	20.2 (10)	4,425 (35)	14.69 (10)	98.22 (8)	40.30 (33)	33.93 (22)	184.5 (36)
Idaho	290 (40)	----*(24)	90.6 (20)	23.6 (35.5)	4,216 (37)	14.36 (11)	75.71 (27)	-------(22.9)	40.86 (9)	226.4 (25)
Wyoming	450 (5)	-----(24)	87.7 (37.5)	18.3 (4.5)	4,937 (27)	50.10 (2)	102.92 (7)	87.44 (4)	37.56 (15)	126 (50)
Colorado	396 (21	1.66 (6)	87.7 (37.5)	21.0 (15.5)	4,997 (25)	16.03 (8)	92.17 (17)	45.89 (30)	35.32 (19)	179 (38)
New Mexico	363 (28)	.33 (30)	87.6 (39.5)	23.5 (33.5)	5,382 (19)	26.21 (4)	73.15 (31)	41.06 (32)	31.18 (28)	245 (16.5)
Arizona	404 (20)	-----(24)	85.2 (48)	22.9 (28.5)	5,590 (12)	14.32 (12.5)	67.69 (37)	60.64 (18)	28.33 (37)	237 (21)
Utah	322 (37)	.88 (13)	91.7 (12)	25.0 (44)	5,096 (23)	20.14 (6)	137.56 (1)	63.24 (16)	31.83 (26)	178 (39)
Nevada	430 (10)	.48 (22)	83.1 (51)	21.0 (15.5)	5,693 (9)	12.65 (18)	71.09 (35)	56.25 (24)	29.47 (32)	216.5 (29)

TABLE III

Washington	420 (13)	2.20 (2)	93.4 (4)	23.9 (38)	5,643 (11)	13.58 (16)	95.95 (10)	80.31 (7)	38.86 (13)	114 (51)
Oregon	448 (6)	-----(24)	88.8 (32)	22.1 (25)	5,535 (16)	22.58 (5)	95.01 (11)	61.47 (17)	38.04 (14)	150 (44)
California	424 (12)	1.26* (9)	85.0 (1)	24.8 (43)	6,600 (2)	10.66 (26)	87.09 (20)	57.88 (22)	44.15 (7)	142 (46)
Alaska	546 (2)	.13 (42)	93.9 (49)	20.0 (9)	6,859 (1)	64.96 (1)	53.61 (46)	60.26 (20)	34.13 (21)	191 (35)
Hawaii	325 (36)	1.99 (3)	89.3 (3)	31.5 (51)	5,390 (18)	13.78 (15)	42.29 (50)	68.72 (15)	34.78 (20)	211 (30)

Source: 1963 Statistical Abstract of the United States; Data for 1959 and 1960.

Note: *The expenditures for current educational services were either not computed or not available for the states of Idaho, Wyoming, Arizona, and Oregon. The rank used for these states is the mean of the ranks of the other 47 states, computed to be 24.
Similarly, the information on public aid was not available for Texas, and Idaho. The mean of the ranks of the remaining 43 states is used. This value was found to be 22.9.

are based upon 51 observations, and are in each case quite strongly inverse (-.577 and -.634), they must be regarded as highly significant. In other words, it is most improbable that no inverse relationship exists between the two.

Initially this inverse relation of income and investment in human capital seems completely illogical. Upon further reflection, however, the existence of an inverse correlation becomes understandable. Considering the fact that all data used in the calculations are for the years 1959 and 1960, and considering further that these years were racked by racial strife and struggle for improved facilities and opportunities in education, the likely explanation becomes apparent. Those states in which the income of the Negro was lowest increased per-capita expenditures for educational services in the effort to raise their incomes, improve the lot of the Negro, and ease racial tension.

At the same time, there has been over the past few years a growing cognizance of the poverty that still exists in the United States and an increasing drive to combat the poverty. No doubt this effort, together with the political pressure to better the condition of the Negro, has resulted in higher expenditures for educational services. However, since this is a recent development, it is probable that the yield to the investment has been slight to date. Because the full results of the increased investment in human capital has not yet been realized, it is logical that the inverse coefficients are an accurate finding.

On the other hand, a statistically significant positive correlation coefficient expresses the relation between the total state population that is Negro and the index of investment. This is, however, quite in keeping with the previous relation established between income and investment. For reasons already given, those states having a higher percentage of total population that is Negro, have also a higher index of investment.

TABLE IV

CORRELATION OF MEDIAN INCOMES OF WHITE AND NONWHITE,

AND THE PERCENTAGE OF TOTAL STATE POPULATION THAT IS NEGRO

WITH THE INDEX OF INVESTMENT IN HUMAN CAPITAL, BY STATE, 1959, 1960

(Ranks in parentheses)

STATES	VARIABLES CORRELATED WITH INDEX OF INVESTMENT			INDEX OF INVESTMENT IN HUMAN CAPITAL
	median income nonwhite male (dollars)	median income white male (dollars)	state % of Negro population	
Maine	1,970 (34)	3,275 (43)	.34% (45)	258 (14)
New Hampshire	2,492 (26)	3,845 (31)	.31% (46)	226.9 (24)
Vermont	2,029 (30)	3,320 (42)	.13% (50)	203.4 (32)
Massachusetts	3,380 (18)	4,422 (18)	2.2 % (36)	138 (48)
Rhode Island	2,503 (25)	3,848 (30)	2.1 % (37.5)	202.5 (33)
Connecticut	3,516 (5)	5,033 (5)	4.2 % (31.5)	144.5 (45)
New York	3,307 (11)	4,798 (10)	8.4 % (21)	157 (43)
New Jersey	3,341 (9)	5,172 (1)	8.5 % (20)	171 (41)
Pennsylvania	3,216 (12)	4,348 (20)	7.5 % (23)	235 (22)
Ohio	3,433 (8)	4,903 (7)	8.1 % (22)	245 (16.5)
Indiana	3,448 (7)	4,456 (16)	5.7 % (27)	242.4 (20)
Illinois	3,613 (4)	5,056 (4)	10.2 % (16)	229.9 (23)
Michigan	3,728 (2)	4,984 (6)	9.1 % (17.5)	172 (40)
Wisconsin	3,631 (3)	4,4a7 (19)	1.9 % (39)	221 (28)
Minnesota	2,616 (23)	4,012 (24)	6.5 % (25.5)	130.5 (49)
Iowa	3,141 (15)	3,708 (35)	9.1 % (17.5)	206.9 (31)
Missouri	2,570 (24)	3,851 (29)	9.0 % (19)	273.5 (13)
North Dakota	1,416 (46)	3,134 (45)	.12% (51)	180.5 (37)
South Dalota	964 (50)	3,043 (46)	.16% (49)	243 (19)
Nebraska	2,882 (19)	3,497 (37)	2.1 % (37.5)	201 (34)
Kansas	2,636 (22)	3,968 (27)	4.2 % (31.5)	138.5 (47)
Delaware	2,421 (27)	4,879 (8)	13.6 % (14)	225 (26)
Maryland	2,756 (20)	4,875 (9)	16.7 % (12)	223.5 (27)
Dist. of Col mbia	3,333 (10)	4,655 (13)	53.0 % (1)	163.5 (42)
Virginia	1,906 (36)	3,734 (33)	20.6 % (9)	287 (12)
West Virginia	2,097 (28)	3,470 (38)	4.8 % (29)	319 (8)

AND NONWHITE,

ION THAT IS NEGRO

PITAL, BY STATE, 1959, 1960

DEX OF INVESTMENT	INDEX OF INVESTMENT IN HUMAN CAPITAL
state % of Negro population	
.34% (45)	258 (14)
.31% (46)	226.9 (24)
.13% (50)	203.4 (32)
2.2 % (36)	138 (48)
2.1 % (37.5)	202.5 (33)
4.2 % (31.5)	144.5 (45)
8.4 % (21)	157 (43)
8.5 % (20)	171 (41)
745 % (23)	235 (22)
8.1 % (22)	245 (16.5)
5.7 % (27)	242.4 (20)
10.2 % (16)	229.9 (23)
9.1 % (17.5)	172 (40)
1.9 % (39)	221 (28)
6.5 % (25.5)	130.5 (49)
9.1 % (17.5)	206.9 (31)
9.0 % (19)	273.5 (13)
.12% (51)	180.5 (37)
.16% (49)	243 (19)
2.1 % (37.5)	201 (34)
4.2 % (31.5)	138.5 (47)
13.6 % (14)	225 (26)
16.7 % (12)	223.5 (27)
53.0 % (1)	163.5 (42)
20.6 % (9)	287 (12)
4.8 % (29)	319 (8)

TABLE IV

North Carolina	1,286 (47)	3,035 (47)	24.5 % (7)	315 (9)
South Carolina	1,135 (48)	3,195 (44)	34.5 % (3)	346 (3)
Georgia	1,489 (43)	3,374 (40)	28.5 % (6)	328.5 (7)
Florida	2,073 (29)	3,743 (32)	17.8 % (11)	304.4 (10)
Kentucky	1,764 (39)	2,928 (49)	7.1 % (24)	336 (6)
Tennessee	1,598 (41)	2,932 (48)	16.5 % (13)	341 (5)
Alabama	1,417 (45)	3,367 (41)	30.0 % (5)	353 (2)
Mississippi	890 (51)	2,757 (50)	42.0 % (2)	345 (4)
Arkansas	993 (49)	2,486 (51)	21.8 % (8)	377 (1)
Louisiana	1,565 (42)	4,001 (25)	31.9 % (4)	246.5 (15)
Oklahoma	1,613 (40)	3,446 (39)	6.5 % (25.5)	244.5 (18)
Texas	1,917 (35)	3,728 (34)	12.4 % (15)	287.4 (11)
Montana	1,461 (44)	3,993 (26)	.22% (48)	184.5 (36)
Idaho	1,986 (32)	4,345 (28)	.23% (47)	226.4 (25)
Wyoming	1,977 (33)	4,866 (17)	.66% (43)	126 (50)
Colorado	3,163 (14)	4,228 (22)	2.3 % (35)	179 (38)
New Mexico	2,009 (31)	4,101 (23)	17.9 % (10)	245 (16.5)
Arizona	1,845 (37)	4,262 (21)	3.3 % (33)	237 (21)
Utah	2,739 (21)	4,558 (14)	.47% (44)	178 (39)
Nevada	3,184 (13)	5,076 (3)	4.7 % (30)	216.5 (29)
Washington	2,989 (17)	4,689 (12)	1.7 % (40)	114 (51)
Oregon	3,019 (10)	4,470 (15)	1.0 % (41)	150 (44)
California	3,515 (6)	5,109 (2)	5.6 % (28)	142 (46)
Alaska	1,831 (38)	4,696 (11)	3.0 % (34)	191 (35)
Hawaii	3,748 (1)	3,649 (36)	.78% (42)	211 (30)
Spearman's Correlation Coefficient (rank)	-.577	-.634	+.522	

Source: Median income figures were taken from the 1963 Statistical Abstract of the United States.
State percentage of Negro population figures were computed from population data given in the 1960 U.S. Census of population-Summary: General Social and Economic Characteristics.
The Index of Investment in human capital was derived previously from information found in the 1963 Statistical Abstract.

E. Conclusion to Part V

The results of my investigation have shown that there is indeed a difference in the median incomes of white and Negro, but that this difference may be explained to a large degree by the corresponding difference between the races in number of years of school completed. Furthermore, it was found that the median incomes of nonwhite males are more closely correlated to state per-capita expenditures for such things as summer schools, adult education, and community services than are the median incomes of white males. While there is no relationship between the percentage of state population that is white and the level of expenditures for educational services, a significant correlation exists between the percentage of total state population that is Negro and these expenditures.

In a later investigation, however, an inverse relation was found between the respective median incomes and the index of investment in human capital. In other words, the need for additional investment in man has to a large extent been met in those states having low median incomes, but the time lapse has not yet been sufficient to permit the results to be mirrored in the income levels.

If the need for investment in human beings is continued to be met, and if this investment brings about the rise in income which would be expected over time, the increase in total income would be quite significant to the economy of the country. If, for instance, the mean income of nonwhite persons fourteen years and older rose to the level of mean white income, the total income of the United States would rise from $322,601,324,901 to $338,014,217,990. This would be an increase of $15,412,893,089 in total income and would constitute a 77.7 per cent increase in

total nonwhite income and a 4.8 per cent rise in total income for the United States. It is, therefore, highly important from the standpoint of Gross National Product that investment in human capital be consistently considered.*

VI: CONCLUSION TO THE PAPER

This paper has been concerned with a review of the literature on human capital, covering the classical view on capital, the Neoclassical view, and the views of the Modern period. Mensuration difficulties raised by the heterogeneity of capital have been discussed. Furthermore, quantity-value data alternatives have been presented. Finally, an empirical indication of the meaningfulness of the concept has been undertaken.

The end result of this study points to the importance of investment in man, to the necessity of including this investment in capital accounts, and to the need for further investigation in the field of human capital.

*Mean white and nonwhite incomes for persons fourteen years and older were computed from the frequency tables of incomes given in Table 97, U. S. Census of Population-Summary: General Social and Economic Characteristics, 1960. Using the mean income figures and the number of persons of respective races having income, the figures shown above were computed.

BIBLIOGRAPHY

Becker, Gary S., "Underinvestment in College Education?," American Economic Review, 50, May 1960, pp. 346-354.

Blang, M., Economic Theory in Retrospect, Homewood, Illinois, Richard Irwin, Inc., 1962, pp. 207-271.

Böhm von Bawerk, Eugen. The Positive Theory of Capital, New York, G. E. Stechert and Co., 1923, pp. 1-125.

Colberg, Marshall R., "Human Capital as a Southern Resource," The Southern Economic Journal, 29, Jan. 1963, pp. 157-166.

Croxton, Frederick E., and Dudley J. Cowden, Applied General Statistics, Englewood, N. Y., Prentice-Hall, Inc., 1960, pp. 478-480.

_____, Practical Business Statistics, Englewood, N. Y., Prentice-Hall, Inc., 1956, pp. 422-424.

Fisher, Irving, The Nature of Capital and Income, New York, Macmillan Co., 1912, pp. 4-20.

Goode, Richard B., "Adding to the Stock of Physical and Human Capital," American Economic Review, 49, May 1959, pp. 147-154.

Jevons, Theory of Political Economy, London, Macmillan Co., 1911, pp. 220-225.

Landmarks in Political Economy, ed. by Earl J. Hamilton, Albert Rees, and Harry G. Johnson, vol. 2, Chicago, University of Chicago Press, 1962, pp. 538-541.

Marshall, Alfred, Principles of Economics, London, Macmillan Co., 1930, pp. 787-788.

Mill, John Stuart, Principles of Political Economy, ed. by W. J. Ashly, New York, Longmans, Green, and Co., 1910, pp. 34-61.

Mills, Frederick Co., Statistical Methods, New York, Holt, Rinehart, and Winston, 1955, pp. 315-316.

Ricardo, David, The Principles of Political Economy and Taxation, New York, E. P. Dutton and Co., 1917, pp. 236-272.

Schumpeter, J. A., History of Economic Analysis, New York, Oxford University Press, 1959, pp. 223-243, 630-635, 902-906.

Schultz, Theodore, W., "Investment in Human Capital," The American Economic Review, 51, March 1961, pp. 1-17.

_____, "Investment in Man: An Economist's View," Social Service Review, 33, June 1959, pp. 109-117.

Senior, Nassau W., An Outline of the Science of Political Economy, London, Bradford and Dickens, 1951, pp. 57-73.

Siegel, Irving H., "Investing in Education and Research," American Economic Review, 50, May 1960, pp. 340-345.

Smith, Adam, The Wealth of Nations, Vol. I, New York, E. P. Dutton and Co., 1924, pp. 241-321.

Statistical Abstract of the United States, 1963, U. S. Department of Commerce, Bureau of the Census, 1960.

Veblen, Thorstein, The Place of Science in Modern Civilization, New York, B. W. Huebsch, 1919, pp. 324-351.

United States Census of Population-Summary: General Social and Economic Characteristics, U. S. Department of Commerce, Bureau of the Census.