

# Human Capital Theory and Retirement Income

C. RICHARD WAITS\* and EDWARD M. MCNERTNEY\*\*

## I. Introduction

The theoretical structure proposed in this paper is intended to provide a basis for identifying what is an appropriate level of income for a retired person. The theoretical structure is defined within the context of a market economy. The expectation is that the model can be empirically specified.

Part II of the paper contains a brief review of ways in which retirement incomes have been defined. An attempt is made in Part III to show the need for a formal theoretical structure and to present the theory in some detail. The closing section summarizes our conclusions and identifies additional research directions.

## II. Conventional Definitions

The problem of defining an appropriate level of income for retired persons stems from the recognition that, once removed from the work force, people face the need to find different methods of obtaining the means for purchasing food, shelter, clothing, health care, etc. To a considerable degree, individuals are expected to provide for their own retirement income. However, this is a complex and risky process. Let us consider the problems faced by an individual who, in the absence of group mechanisms, is trying to

assure himself an adequate income in retirement.

Schulz (6) lists the following difficulties:

1. A person does not know with certainty when he/she will die;
2. One does not know exactly what the future income stream will be;
3. One does not know what the basic retirement needs will be nor what life-style will ultimately be preferred for that period;
4. One does not know when retirement will come;
5. One cannot reliably predict the future rate of inflation nor that of economic growth.

Given all these uncertainties, one must ask how much an individual should save in order to provide an adequate income upon retirement. One estimate is that an individual "... would have to save about 20% of one's earnings each and every year ..." to provide a retirement income equal to 60-65 percent of average earnings during his last five years of work.<sup>1</sup>

Pension plans have traditionally been designed to deal with the risk problem. Such programs utilize the basic insurance principle of sharing risks. Thus, if the number of persons in a program is sufficiently large, retirement costs can be spread over average life expectancies; the excess from those who

\*Professor of Economics, Texas Christian University

\*\*Assistant Professor of Economics, Texas Christian University

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<sup>1</sup>James H. Schulz, *The Economics of Aging*. Wadsworth Publishing Company, Inc., Belmont, California, p. 72.

die early accrues to those who live longer than the average.

Conventional pension programs, however thoroughly entrenched and justified, do not necessarily provide an adequate or appropriate income. The income they provide is based on one of the two methods discussed below, which may or may not provide an amount which accurately reflects what the individual deserves.

The two methods for arriving at an appropriate level of retirement income which have been proposed in the literature are:

1. that retirement income should be based on need; and
2. that retirement income should be based on some portion of one's earnings during some portion of his/her work-life, often only that portion one can "afford" to provide.

The first of these guidelines takes a definition of need that is usually limited to food, shelter, clothing, and medical needs. The argument is that society has no responsibility to the individual beyond a subsistence level of consumption. Any additional consumption must be provided by the retired person from accumulated property resources.

The second of these guidelines does recognize that people have different needs and different preferences and seeks to tie retirement benefits with previous earning capacity. This is the concept called "earnings replacement." The idea of an "earnings replacement" standard defines an appropriate retirement income level as an arbitrarily specified percentage of an individual's earnings in an arbitrarily defined period prior to retirement.

### III. A Proposal for a Formal Structure

We are concerned with three problems that relate to identifying an appropriate level of income for retirees. These problems are:

1. that there is no formal theoretical justification for either of the two methods described above;
2. that current discussion focuses on retirement benefits as transfer payments from the currently employed population; and
3. that neither of the guidelines provides a theoretically satisfactory method of estimating the proper level of retirement benefits.

The absence of a formal theoretical structure for defining retirement income levels becomes even more clear when one attempts to define the problem as a part of the more general problem of income distribution. It is generally argued that physically and mentally capable persons receive income based on the following criteria:

1. their skill level;
2. the amount of labor time supplied; and
3. the amount and types of other assets owned and offered to the market.

In short, one's income is tied directly to the value of his/her productivity.<sup>2</sup> With respect to the working population, it is recognized that one's skill level is affected by three variables:

1. the level of prevalent community skills (those possessed by almost everyone);
2. the amount of formal education and training off the job; and
3. the amount and quality of one's job experience.

The second and third of these variables are separable from the first and can be treated differently. People who have invested in human capital are entitled to an income based on their unique productivity in addition to

<sup>2</sup>The authors, of course, recognize the controversy surrounding this issue and are certainly aware of other factors which prevent the distribution of income from reflecting productivity alone.

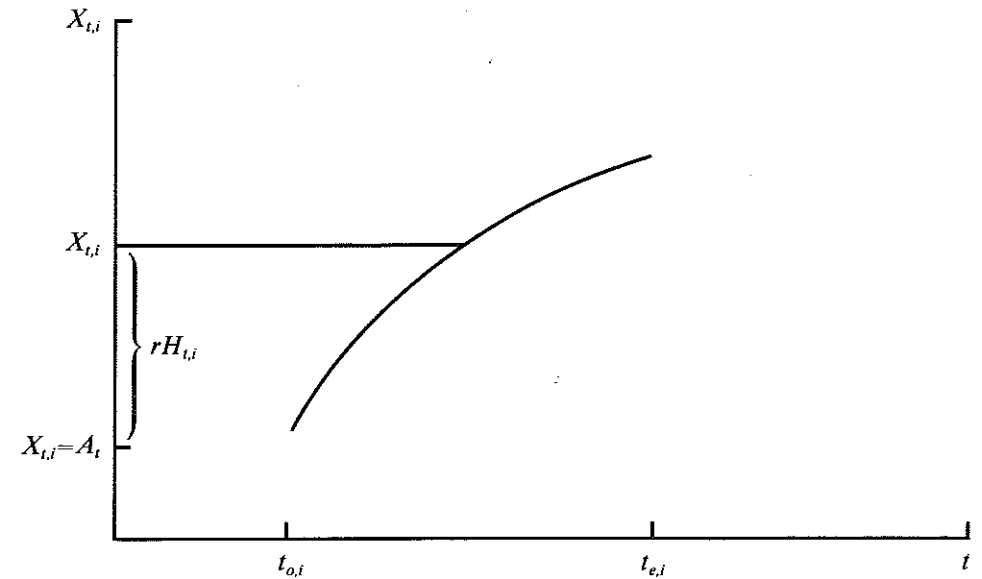


Figure 1

their pure labor income. This proposition is embodied in Equation 1.1.

$$X_{t,i} = A_t + r_t H_{t,i} \quad i = 1, \dots, n \quad (1.1)$$

Where  $X_{t,i}$  is person  $i$ 's potential earnings at time  $t$ ;

$A_t$  is the potential earnings of a person with only the basic, community level skills;

$H_{t,i}$  is person  $i$ 's stock of human capital;

$r_t$  is the average rate of return on human capital at time  $t$ .

$H_{t,i}$  is the sum of past investments in human capital<sup>3</sup> or:

$$H_{t,i} = \sum_{j=0}^t I_{t-j,1} \quad (1.2)$$

Individual  $i$ 's earnings stream can be represented in the following diagram:<sup>4</sup>

<sup>3</sup>See Blinder (3) for a discussion of this approach.

<sup>4</sup>The curve could also peak before retirement. We have chosen a curve that continually increases at a decreasing rate for discussion purposes only. See Taubman (7) for a discussion of this issue.

where  $t_{o,i}$  is individual  $i$ 's year of entry into the labor force, and

$t_{e,i}$  is individual  $i$ 's year of retirement.

The shape and location of the curve can be affected by various factors, such as the amount of investment in human capital at various time periods, injury and the state of the economy. In general, the higher is one's investment in human capital, the higher will be one's income. The rate of accumulation may vary between job classifications.

The level of  $A_t$  represents the return from "pure labor;" i.e., that which can be earned with average skills at time  $t$ . It is our contention that the level of  $A_t$  is a function of the total stock of human capital at time  $t$  and that the relationship is direct. That is, the larger is the past accumulated human capital, the larger  $A_t$  will be.

The graph shown in Figure 1 shows the termination of an individual's income claim at retirement. The human capital approach has supplied a method to explain the earnings of

persons in the working population but has not been used to explain the income levels of retirees. We propose to extend the approach so that it rationalizes the receipt of income by retired persons and, in the process, establishes precisely the link between retirement income and previous earnings levels. The prevailing view is that any income which is received by retired persons constitutes a transfer payment from the working population. Retired persons are thus considered a burden on the productivity of employed persons and retirement income is a charity which depends on the good will (and the preference for present consumption) of those employed. This is, certainly, a cause for friction in the political sphere since it pits present consumption against retirement income.

The typical view that retirement income is charity reflects the perception that the value of a worker's skills becomes zero at the time of retirement. An alternate view is that the skills of a retired person have a continuing asset value and that persons who have invested in human capital are entitled to a retirement income which reflects their contribution to the productivity of the employed generation. It is relevant in this connection to consider the differences and similarities between physical capital, human capital and technology in general. First, all three are cumulative through history. Each generation adds to a stock of capital or technology which it has "inherited" from previous generations. Physical capital is sustained through the practice of charging each year's depreciation against that year's current output, making sure the total value of assets is maintained, though the form may be different. That is, once in place, the value of physical capital is maintained through replacement investment.

Knowledge and skills are sustained through both formal and informal processes of education and training. Once developed, new knowledge and skills are maintained by being

taught to others, both of the same and of succeeding generations.

Second, all three require more or less conscious decisions to forego current income or consumption goods in order to acquire them. All unquestionably establish an income claim on the current output of the nation's economy. All involve permanent change in the productivity of the producing sector. Finally, all three provide a basis for further development of productivity, skills, and knowledge.

Third, the ownership of human capital, like the ownership of physical capital, might be considered to be vested in the individual whose income has been reduced by the amount foregone in its creation or whose consumption was reduced by its cost of acquisition for at least as long as he/she lives.

The similarities end, however, when one considers the transfer of ownership of physical and human capital. While physical capital is directly inheritable by specific bequest, skills and technology are usually not. The fact that some technology can be inherited only for limited periods (in the form of patents or copyrights) suggests that skills and knowledge will eventually be diffused among the population. At some point, they become a part of the basic, community skills and no longer differentiate one group of workers from another. Intergenerational transfer of other skills is accomplished at the workplace where "learning by doing" becomes the typical mode for training workers.<sup>5</sup> We may expect, then, that the level of  $A_t$  will increase as total investment in human capital increases.

In a market-like setting, others can acquire the ownership of human capital only if the owner is compensated for the amount of his/her outlays. The transfer requires, first,

<sup>5</sup>O. E. Williamson, M. L. Wachter, & J. Harris, "Understanding the Employment Relation: The Analysis of Idiosyncratic Exchange," *The Bell Journal of Economics*, 6 (Spring 1975), 250-278.

that some formal procedure be devised to establish the market value of this human capital, and second, that a procedure be devised for formalizing the transfer of its ownership. The argument also involves the assumption that the individual is due the full return on whatever portion of his human capital that remains in actual use by someone else after she/he retires from the active labor force. We suggest that during one's retirement years, the community is in the process of purchasing the person's human capital accumulated to the date of retirement and is paying "interest" on the unpurchased balance. Alternatively, the community is paying a "rental" on the retiree's human capital until his/her death, at which time this person's human capital will simply be absorbed into the community's basic, common skills.

With these characteristics, it is clear that the lifespan of human capital extends beyond that of the generation of workers which invested in that human capital. While it is clear that one person does not apply his/her own human capital without being in the active labor force, it must also be recognized that the person's human capital is still being used to maintain the productivity of the employed labor force. If the ownership of the asset continues in the person who developed or perpetuated the skill, then the level of output attributable to this asset belongs to this person, regardless of whether he/she remains in the labor force.

Thus, we are left with a dilemma: the individual has invested in human capital and has acquired considerable skill and knowledge over his/her working lifetime but under present arrangements faces the possibility of surrendering this asset without any compensation. Clearly, if we are going to expect people to incur the expense of this type of investment, we must be certain that they are justly compensated when it comes time to surrender the asset. Therefore, a scheme must

be devised whereby the currently working population can purchase the human capital of the retiree.

There are two steps to developing such a scheme:

1. To devise a method to alter the form of the asset in retirement; and
2. To devise a method for transferring ownership of the retirement asset to the employed labor force.

We will utilize the concept of depreciation to develop the first step in the process. If we depreciate human capital once it has been acquired, then it will be possible to accumulate its value at retirement and to spread the cost of acquisition throughout the period of its ownership. Let us modify equation 1.2 as follows:

$$H_{t,i} = \sum_{j=0}^t (I_{t-j,i} - \delta H_{t,i}) \quad i = 1, \dots, n \quad \text{Eq. 1.2'}$$

where  $\delta$  is the rate of depreciation and is equal to one divided by the working lifetime of individual  $i$ .

Each year in the labor force an amount equal to that year's depreciation is added to the retirement asset. At the end of the person's worklife all of his/her accumulated human capital has been translated into the retirement asset which is equal in value to the accumulated investments in human capital and still represents ownership of his/her human capital which is now being used by the current labor force. This process is summed up in equation 1.3:

$$RA_i = \sum_{j=0}^t f(\delta_j) \quad i = 1, \dots, n \quad \text{Eq. 1.3}$$

where  $f$  is the method of depreciation allowance;

$RA_i$  is the value of the retirement asset.

The next step is to devise a means for transferring the ownership of the retirement asset to the employed labor force. The method we propose is intimately associated with the means of payment of retirement income. Thus, let us define our concept of retirement income first, and then explain how the income should be provided and the transfer accomplished.

At retirement, the retiree possesses two types of claims on the nation's output during the balance of his/her life. One is the amount of recoverable investments in human capital and the other is the income stream generated by the use of his/her human capital by the employed labor force. There are two ways to arrange for payment of these claims.

One is to deposit each year's depreciation equivalent in a pool of retirement assets from which each of a given group of retirees may draw an amount equal to the income from his/her human capital plus a portion of the principle in such a way that at the end of his/her life expectancy, a person's share of the pool is completely exhausted. In such a case, the unclaimed portion belonging to those who die at an earlier age will just compensate for the amounts needed by those who live longer. This is the pension fund concept.

The other way in which to arrange for the payments due a retiree is for the currently employed labor force to enter into a formal contract to pay a "rental fee" for the use of the retirement asset equal in amount to the claim belonging to the retiree. This is the "social security concept."

Thus, the transfer of ownership will be accomplished by the employed labor force paying a specified portion of the value of the retirement asset to the retiree in each year of his/her expected remaining lifetime.

The final step is to define retirement income, *in toto*. A part of a person's retirement income would consist of income on the unreclaimed portion of his/her human capital.

Part would consist of liquidation of a portion of the original investment in human capital. The final part would be that associated with pure labor income. The latter portion must be provided by the individual.

#### IV. Conclusions

The major conclusion to be reached from the preceding theoretical structure is that the level of one's benefits in retirement can be measured with greater precision than it can be under present *ad hoc* arrangements. Thus, the rationale for retirement benefits and their appropriate level can be set without making it the subject of political debate. This leaves the question of format to be settled in the political arena but the amounts due could be determined on more technical grounds.

Moreover, it would no longer be necessary or justifiable to consider retirement income a matter of charity on the part of the working population. Present human capital models establish the claim to income while one is working but offers no provision for the recovery of (or for saving) the initial investments during one's retirement. Such a failure tends to perpetuate the feeling of dependency among retirees by allowing the working population to believe that its income is a payment for its own productive capacity without reference to the base upon which that productivity is built. The theoretical argument developed here suggests the relevance of human capital theory first in rationalizing the receipt of retirement income, and second, in identifying its appropriate level.

While no specific suggestions are offered here for implementing the theory, the authors hope to address this matter at an early date.

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