인적자본의 이론에서 재 고찰한 교육의 분포와 소득의 분포와의 관계에 관한 연구

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The Distribution of Education and the Distribution of Income -- reconsidered within the human capital framework

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초 록

교육의 분포와 소득의 분포와의 관계를 설명하는 이론으로써 인적자본이론은 몇가지 점에서 비판을 받아 왔다. 본 연구에서는 이러한 비평을 분석해 보았다. 전통적으로 인적자본이론은 노동의 공급측면에 중점을 두어 왔다. 이 것을 노동의 수요측면과 연계시키기 위하여 노동의 한계생산력 이론을 인적자본모형과 접목시키려 한 시도가 있었다. 그러나 그 결과는 명확한 것은 아니었다. 그 이유는 교육을 투자로 볼 것인가 또는 소비로 간주할 것인가의 문제뿐 아니라 투입과 산출사이의 불확실성도 인적자본이론을 응용한 모형상정에 불명확성을 제기하게 하였다. 이러한 점들은 관련된 정책의 수립 및 집행에도 영향을 줄 것으로 사료 된다. 본 주제에 대한 보다 신뢰할 만한 결론을 위해서는 현실성 있는 가정에 입각한 모형의 선정이 필요한 것으로 생각된다.

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The purpose of this paper is to examine the human capital theory which explains the relationship between the distribution of income and the distribution of education. Section I contains general critique of the human capital approach to income distribution, pioneered by Becker (1964). As developed so far, human capital approach seems incomplete, since the distribution of income is made to depend on the distribution of education but the latter is not explained. In the section II and III, some points of the critique of the human capital theory will be discussed in detail. There are several deficient points in the human capital theory. Among them, two points will be discussed. Definition problems between investment and consumption will be raised in section II and risk or uncertainty problem in human capital investment will be dealt in section III. In section IV, some policy implication will be argued in relation to public support for human capital investment. In this section we will review how public resources can be allocated to human capital investment in efficiency and welfare grounds. The concluding section discusses the implications of all these points in the study of education and the distribution of income, within the framework of human capital theory.

1. The Human Capital Approach to Income Distribution

Human Capital theorists\(^1\) have considered a model in which individuals invest in themselves by undergoing training, during which their income is zero. It is assumed that abilities and opportunities are equal. Everyone is free to undergo education as long as he likes. Individuals are free to borrow as much as they require at a given rate of interest, which also represents the rate at which they discount future income. Individuals are assumed to be interested solely in maximizing the present value of their income, i.e. the work-leisure choice is ignored and non-pecuniary advantages or disadvantages of different jobs are disregarded. Earings per unit time over the working life

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are assumed to be constant. Under these conditions, equilibrium occurs when the present value before training starts of all income streams is equal. Human Capital Theorists explain their model as follows:

Let \( y_i \) = the income per unit of time of a person with \( i \) years of education

\( W_i \) = Present Value at the start of education of the earnings stream \( y_i \)

\( r \) = rate of discount

\( T \) = economic life span, assumed to be the same for all individuals

then,

\[
W_i = e^{-ri} \int_0^T e^{-rt} y_i dt = \frac{e^{-ri}y_i(1 - e^{-rT})}{r}
\]

in equilibrium, \( W_i = W_j \), for all \( i \) and \( j \)

\[
\therefore e^{-ri}y_j(1 - e^{-rT}) = e^{-rj}y_j(1 - e^{-rT})
\]

suppose \( j \) needs no education, \( j = 0 \)

\[
(y_i/y_0) = e^{ri}(1 - e^{-rT})/(1 - e^{-rT}) \approx e^{ri}, \text{ if } T - i \text{ is large.}
\]

\[
\therefore \log y_i = \log y_0 + ri
\]

Distribution of income depends on distribution of education, assuming equality of abilities and opportunities for all individuals. If education is normally distributed, then income will be log normally distributed.

However, a fundamental theoretical criticism of the human capital approach is that it is incomplete. The distribution of income is made to depend on the distribution of education (or training in general), but the latter is unexplained. It seems to be implied that the distribution of education could be anything but this is surely not the case. In a more complete model, the distributions of income and education should be jointly determined. The human capital approach has so far only analysed the supply of educated manpower. It argues cogently that only if the income of well-educated people is higher
than that of less well-educated people will the former be induced to incur
the opportunity cost of reduced earnings during their training period. But it
has not integrated this insight with a theory of the demand for educated
manpower, a theory which would explain why firms are willing to pay
higher incomes to more educated people. To construct such a theory it is
necessary to specify the effect that education is supposed to have on an
individual's productivity.

Becker(1967) has stressed as one of the virtues of the human capital
approach that it brings the theory of income distribution within the general
framework of economic analysis. Income distribution is made to depend on
the maximizing behaviour of individuals, instead of on stochastic processes of
an ad hoc nature. If this claim is to be made good, then it should be
possible to predict the distribution of income from a general equilibrium
model in which the allocation of factors of production, their prices and
investment in human capital are all simultaneously determined. In particular,
if income distribution theory is to be genuinely integrated into the general
body of economic theory, then it must somehow be linked up with the
marginal productivity theory of factor pricing.

On this point, Oulton(1974) tried to incorporate productivity with the
basic human capital framework. He considered several models, but found
neither models capable of reproducing the type of income distribution found
empirically.

He concluded that:

1) The more itself could be wrong, i.e. the marginal productivity theory
may be wrong.

2) Or, the model might right but assumptions could be wrong or at least
overrestrictive.

In case of two, he relaxed some assumptions in his models and concluded
that disequilibrium and inequality of ability and opportunity would significantly

1974, pp. 387-402 for details.
affect the distribution of income. For disequilibrium, he argues that the equilibrium positions in the models are short run ones, based on peoples’ expectations of future earnings. If expectations are frustrated, it will not persist. He also contends, for inequality of ability and opportunity, that even though some empirical evidences show a very hard to identify and to measure the abilities and the effect of inequalities of opportunities.\(^3\) On inequality of ability, Timbergen(1975) argues that:

"The particular advantage of a combined demand and supply approach are the following. Such a theory reminds us, to begin with, of the fact that for income equalization equal capabilities of all individuals are not required, but rather equality of the demand for and supply of the various different types of production factors, in particular labour."

However, both of the analyses are one sided, either input side analysis or output side analysis. In explaining the relationship between the distribution of income and the distribution of education, we should consider the effects of random disturbances on both sides, input side (ability) and output side (demand and supply). In the following two sections we shall look at some other points as the critiques of the human capital approach.

### 2. The Definition Problem between Investment and Consumption for Education.

The original contributions on human capital by Becker and Mincer posit that individuals’ motivation to invest in themselves is the maximization of the present value of net returns. The model has been very fruitful in explaining a great deal of human behavior. The literature deriving from the original work is immense and cannot be reviewed briefly. The critical

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3) On empirical evidences, there are some other conclusions. See Mincer(1997).
literature is much shorter. One of the main points made by it is that human capital is both a producer and a consumer good. Since these two functions of human capital are inseparable - being lodged in the same person - the conventional treatment has a tendency to forget that the proper object of life is happiness and not goods and services.

A reasonable approach to the educational decision is to ask what determines the optimal level of schooling within a framework of utility maximization. Such a framework appears necessary if one is to meet some of the more serious objections to human capital theory of the conventional variety in which human capital is treated as a producer good alone, when it is quite clear that it also is a consumer good. Since these two functions of human capital are not separable, (human capital being lodged in the person of the owner), the conventional treatment, although simple and sometimes enlightening, leads to some obvious difficulties, especially in the proper interpretation of rates of return.


The theory of investment in human capital is conventionally developed under the assumption of perfect foresight. It is, of course, widely recognized that investment in human capital is subject to a considerable risk (see Gary Becker(1964), Theodore Schultz(1971) ). There are two types of uncertainty which should perhaps be distinguished:

1) Uncertain Inputs: There is imperfect knowledge of individual exogenous characteristics such as ability which affect the earning capacity. There is also uncertainty of the quality of schooling; that is, the amount of human capital which would result from the commitment of time and money into learning process.

2) Uncertain Outputs: There is imperfect knowledge of future demand and supply conditions. Consequently the output (earning capacity) from a
given level and type of human capital is uncertain.

So far, several attempts have been made to incorporate this element in the basic theory of human capital. In most of analyses, it is assumed that the returns from nonhuman capital are known with certainty. Implicit in this simplification is the notion that human capital is in some sense more risky than physical capital. From the social point of view, this need not be the case since compared with physical capital, human capital is quite flexible in its uses under varying economic circumstances. Nevertheless, from the point of each individual, human capital is probably more risky than physical capital. The main reason is that human capital cannot be bought or sold and cannot be separated from its owner. The possibilities for diversification are therefore very limited in the case of human capital. To diversify his human capital, the individual must acquire "general" education and forgo the advantages of specialization. In the case of physical capital, the spread of ownership among many individuals allow specialization in production together with diversification of individual portfolios.

The hypothesis that human capital is more risky need not imply that the investment in human capital is discouraged or that the expected marginal return on human capital is higher. Within the simple two-period model to examine the effect of uncertainty on the level of investment in human capital, Levhari and Weiss(1974) argue that the relation between the expected marginal rate of return on human capital and on other assets depends upon the correlation between the marginal and average rates of return to human capital. If this correlation is positive, or, equivalently, if the variance in earnings is increasing with the level of schooling, then, and only then, will the expected return on human capital be higher than that of the safe nonhuman asset. The hypothesis of increasing risk(i.e., increasing variance) is, of course, quite plausible and is shown to be consistent with empirical findings.4)

4) Levhari and Weiss(1974), Olson and Shefrin(1979), Willis(1986), et als
The introduction of uncertainty has a significant effect on the testable hypothesis which one would derive from theory of human capital, as well as on the interpretation and policy implications of existing evidence such as estimates of rates of return. Not surprisingly, the nature of the modifications which must be made when risk is introduced cannot be determined by a priori level. It is necessary to presuppose some statistical relations which need to be verified empirically.

4. Policy Implications

On this issue of policy implications Schultz(1961) argues that:

"Should the returns from public investment in human capital accrue to the individuals in whom it is made? The policy issues implicit in this question run deep and they are full of perplexities pertaining both to resource allocation and to welfare. Physical capital that is formed by public investment is not transferred as a rule to particular individuals as a gift. It would greatly simplify the allocative process if public investment in human capital were placed on same footing. What then is the logical basis for treating public investment in human capital differently? Presumably it turns on ideas about welfare. A strong welfare goal of our community is to reduce the unequal distribution of personal income among individuals and families. . . . It may well be true that public investment in human capital, notably that entering into general education, is an effective and efficient set of expenditures for attaining this goal."

However, he seems to misinterpret policy implications on human capitals in two points. First, in efficiency (resource allocation) standpoint, he does not take into account the social benefit accruing from the public support for education. Let us consider the different kinds of externalities, social benefits. One externality arises when education increases the productivity and income of a worker who was formerly supported by redistributational transfer
payments. In this case, tax-payers at large receive the external benefit in the form of a reduction in their tax liabilities. The other externalities that education may cause is a reduction in crime if correlation between education and income is high. By increasing labor productivity, education raises the opportunity cost of crime. Another externality is the increase in taxes paid by individuals as a result of higher income they earn because of their investment in human capital. Therefore, in these points of view, it can be argued that the returns from public investment in human capital accrues not only to individuals themselves but also to the society as whole. Hence, we can also consider public support to education in efficiency standpoint. But there is a question. How could the jobs be created for the individuals who have successfully finished investment in human capital? In this sense, policy-makers should also make non-human investment in efficiency view point. In other words, they might need a trade-off of public supports in between human capital investment and non-human capital investment.

Second, in welfare standpoint, Schultz argues that public investment in human capital is effective and efficient in the view of redistribution of income. However, the point is this; the resources for public investment are not immense. Therefore, there would be also raised a trade-off of public investment between in efficiency view point and in redistribution of income view point. Shaffer(1961) argues, in his comment on Schultz's article, that:

"The return on the investment (in human capital) cannot be computed satisfactorily as both the amount of pure 'investment' and the return to be allocated thereto are conjectural. And in society's allocation of productive resources for the advancement of economic and noneconomic welfare, the question of financial wisdom of any direct expenditure on man must be reduced to one of secondary importance."

However, we do not know whether it can be called as 'one of secondary importance'. As for one way to solve this, political procedures can be used.
5. Conclusion

The human capital theory as an explanation of the relationship between the distribution of income and the distribution of education has been criticized in several points. In this paper, some of them were considered. Traditionally, human capital approach emphasized the supply of types of labor. To incorporate this with the demand for them, marginal productivity theory of factor pricing was linked to the basic human capital model. However, it did not present any concrete results. The human capital theory has also some other problems - like the definition problem between investment and consumption for education, and uncertainty problem on input and output side. All these points have some relations with policy implications.

The results or the conclusions in several models on this subject are based on some assumptions. Whatever models on this subject are, one point is clear. That is, the less realistic the assumptions are, the less convincing the conclusions are. In this sense, for the reliable conclusions on this subject, further study is necessary.

REFERENCES


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