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On the Net Present Value Rule for Educational Investments

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Hansen (1963), in his study on the profitability of investment in education, has noted that the present value of lifetime income is deficient as an investment criterion because it omits the direct educational costs from the benefit-cost calculations. He also demonstrates that the ranking of educational investments is sensitive to the choice of the discount rate used in calculating the present value estimates. He argues that the internal rate of return corrects the above deficiencies and, therefore, is a superior tool for analysis. Similar arguments in favor of the internal rate of return (IROR) have been voiced by other authors.¹

Unfortunately, much of the argument against the present value rule is based on false premises. First, it is obviously not the present value of gross lifetime income which should be compared with the IROR; rather, the present value of lifetime income *net of costs* is the proper rule for comparison. Second, the fact that the net present value may be sensitive to the rate of discount is not a deficiency but, rather, an important asset which ought not to be neglected. Further, when investments are sequentially interdependent or mutually exclusive, as they are in education, the IROR rule will frequently be unreliable.

It has been argued that the net present value rule is not applicable unless and until the "true" and appropriate rate of discount is known. Since there is no agreement on which rate of discount is "proper" for public or private investment decisions, it appears that the net present value rule is highly unsatisfactory in actual applications. The IROR, on the other hand, can be computed without any reference to a discount rate, and thus it appears to be a great deal more useful for application of public or private investment decisions.

This argument, however, can hardly be justified on either theoretical grounds or computational convenience. First, the IROR rule states that the computed internal rate of return should be compared with the chosen discount rate (Prest and Turvey 1965, p. 703). While it is true that one could compute the IROR without having to make a decision on the "proper" discount rate, once a decision on the profitability of the invest-

¹ See, for example, Carrol and Ihnen (1967).

ment is sought—and this is the prime objective of cost-benefit analysis—a choice of a discount rate must be made. In other words, the use of the IROR postpones the decision of which rate of discount is “proper” to the time when an investment decision is to be made. Second, the argument that the use of the net present value rule necessitates computation of the net present value for a wide range of discount rates is a very weak argument against the application of the latter, since the utilization of electronic computers (now so widely available) makes such computations a simple matter. Indeed, where the income stream takes other than a mathematically defined form, the computation of the IROR involves iterations entailing computations of a series of present values in any case. Moreover, the knowledge of the sensitivity of the net present value to variations in the rate of discount is of paramount importance to the decision maker (Hirshleifer, DeHaven, and Milliman 1960, pp. 165–66).

In a recent article, Schultz argues that economists are only aware of “Hirshleifer’s paper [1958], but unaware of Bailey’s classic paper [1959], which shows that Hirshleifer’s analysis is not sufficient to solve the multi-period case in full generality” (Schultz 1967, p. 307). Even if it were true that economists are unaware of Bailey’s contribution,² the fact that the net present value rule is not always correct provides no justification for the use of the IROR. This comment is particularly pertinent for investment decisions involving the ranking of investments, in which the IROR can often lead to erroneous results.³

It is hoped that this note will stimulate researchers in this area to present information concerning not merely internal rates of return but also net present values for a wide range of discount rates.

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² It is not clear what evidence Schultz has to corroborate this statement. One indication that it may not be true is the fact that the reading list in the capital theory course in my alma mater (Iowa State) included both Bailey’s and Hirshleifer’s papers.

³ For authoritative analyses, consult, for example, McKean (1958) and Eckstein (1961).

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