of expected benefits E_1, E_2, * * * $E\infty$ discounted at at rate $(1+r)$, when the individual has a probability of survival through the period of p_t, is

$$W=\sum_{t=0}^{\infty}\left(\frac{E_t p_t}{(1+r)^t}\right)$$

The E_t are the net expected money values of the various advantages of a given year.[12] Those advantages that cannot be converted into money values are not included in the present value, but the worker can evaluate medical plans, holidays, and pension plans. Here we consider only two kinds of advantages; namely, wages (W) and pension costs (P).

The probability of surviving through the period (p_t) depends both on mortality rates and retirements rates. The relevant interest or discount rate is the rate at which the worker actually discounts the future in making decisions, but this rate may not be unique. For most workers the interest rate for borrowing exceeds the rate for lending, but in fact most workers both borrow and save (or lend). The desired rate is neither his borrowing or lending rate, but the discount rate at which the worker would sacrifice expected income next year for cash today. This rate should depend on his present nonhuman wealth (wealth that is independent of work), opportunity rate of earnings on assets, and the risk that the worker views as inherent in his expected income. If he thinks there is a large variance in the amount E_t in year t he might use a higher rate of discount than if the variance of E_t were low, because of the diminishing marginal utility of income. Thus two E_t's of the same amount in the same year may have different subjective values.

The worker may also have different rates of discount for near and distant outcomes. When we use a single rate we must take account of this possibility by considering that the worker may prefer one of two equal present values because it has larger benefits in the near future. In figure 1, for instance, a worker should prefer the lifetime earnings shown by the lower of the two curves. At every date in the future stream 2 has the lower present value, but at time 0 (now) it has the same present value as stream 1. This means that the payoff completed by time 1 is larger for stream 2 than for stream 1.

During the early years of most careers, the worker invests in his earning abilities and the present value of his earnings increases. While investment continues for many years in some occupations, the aggregate amount is less than gross earnings (including the forgone earnings caused by the investment activities), so that the worker receives a cash income. The longer the period of net investment, the longer maximum lifetime present value is delayed.[13] The maximum present

[12] By expected value is meant the sum of the k possible outcomes, e_{ti}, each weighted by its probability of occurrence (q_{ti}). Thus the expected value is

$$E_t=\sum_{i=1}^{k} e_{ti}q_{ti}$$

[13] For a discussion of human capital as a function of age, see Burton A. Weisbrod, "The Valuation of Human Capital," *Journal of Political Economy*, October 1961, pp. 425–436.