# SCHOOLING AND EARNINGS OF LOW ACHIEVERS: COMMENT

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Stanley H. Masters

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Thomas I. Ribich

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ABSTRACT

In a recent article in the American Economic Review Hansen, Weisbrod, and Scanlon are primarily concerned with estimating "the extent to which schooling, as contrasted with 'learning' or job training, is an important determinant of earnings of low achievers". In addition, they emphasize that there is a low net lifetime payoff to education (learning plus schooling per se) for low achievers. At reasonable discount rates, they estimate that the payoff is less than the cost of the education, and they suggest that rate of return for education is less than for training. Perhaps of greatest importance, their analysis suggests that the rate of return to education for low achievers is less than for the average student.

It is our contention that the calculations performed by Hansen, Weisbrod, and Scanlon do not demonstrate that education has a poor payoff for low achievers. The difficulty occurs because of the way their sample is stratified. Since the sample is limited to those with low scores on their measure of learning, their estimates of the effect of schooling on learning are biased downward. Since this effect is an important component in their calculation of the payoff to education, their estimates for this payoff may be much too low.

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In their recent article in this review, W. Lee Hansen, Burton A. Weisbrod, and William J. Scanlon (HWS) are primarily concerned with estimating "the extent to which schooling, as contrasted with 'learning' or job training, is an important determinant of earnings of low achievers". In addition, they consider the net lifetime payoff to education (learning plus schooling per se) for low achievers and emphasize their conclusion that, at reasonable discount rates, the payoff is less than the cost of the education and the payoff rate less than the payoff rate to training.[1] Their analysis further suggests that the rate of return to education for low achievers is less than it is for the average student.[2] It is our contention that the calculations performed by HWS, with the data they use, do not provide convincing support for these latter inferences.

The HWS conclusions are based on a statistical analysis of an interview questionnaire given to 2,500 men, ages 17 to 25, who are "low achievers", as measured by their scores on the Armed Forces Qualification Test (AFQT). In calculating the payoff to education, HWS take into account the effect of schooling on learning,[3] and the earnings effect of that learning, as well as the earnings effect of schooling that is independent of the increase in learning. This measure of the payoff to education, combining the schooling and learning effects, is therefore practically the same as

the estimates in the standard studies of this issue which do not make a distinction between the two effects. The only major difference is that HWS are focusing on low achievers, defined strictly as individuals who scored below the 30th percentile on the AFQT exam. The problems created by that special stratification seem to us to be more severe than HWS are willing to admit.

The qualification is made by HWS that their results for 17-25 year-old low achievers may very well understate the effect extra education produces for school-age low achievers, because "some youthful low achievers might have escaped this status by age 17-25, and did so as a result of subsequent schooling". Nevertheless, HWS argue that calculations with their sample at least answer directly the question "What has been the effect on income of differential amounts of schooling for men aged 17-25, who, following completion of their schooling, were judged to be low achievers?"[4] The HWS approach implies that, if we want to determine the economic value of (say) finishing high school for this group of young-adult low achievers, we should look at the difference between the average earnings of high school graduates who are in the low-achiever sample and the average earnings of high school dropouts in the low-achiever sample. In our view, this type of comparison leads to an understatement of returns for the young-adult low achievers (as well as for "school-age low achievers") and the understatement could be quite serious.

In Figure 1 the normal curve to the left represents an assumed frequency distribution of AFQT scores for <u>all</u> high school dropouts taking the AFQT test, and the normal curve to the right represents a similar

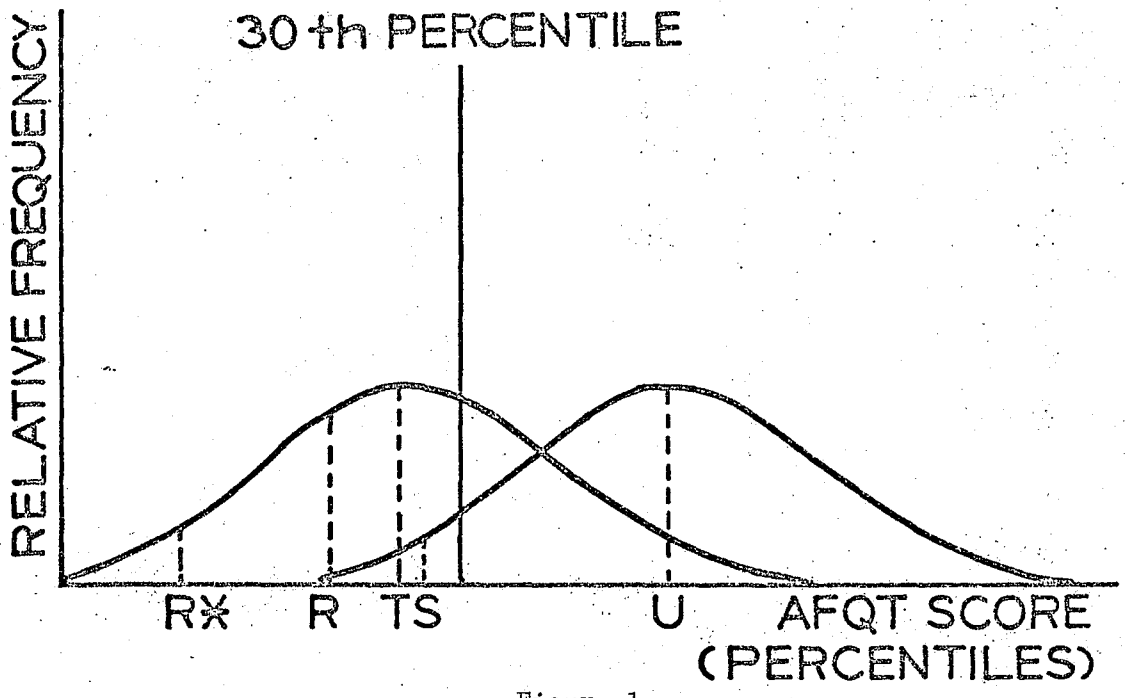


Figure 1

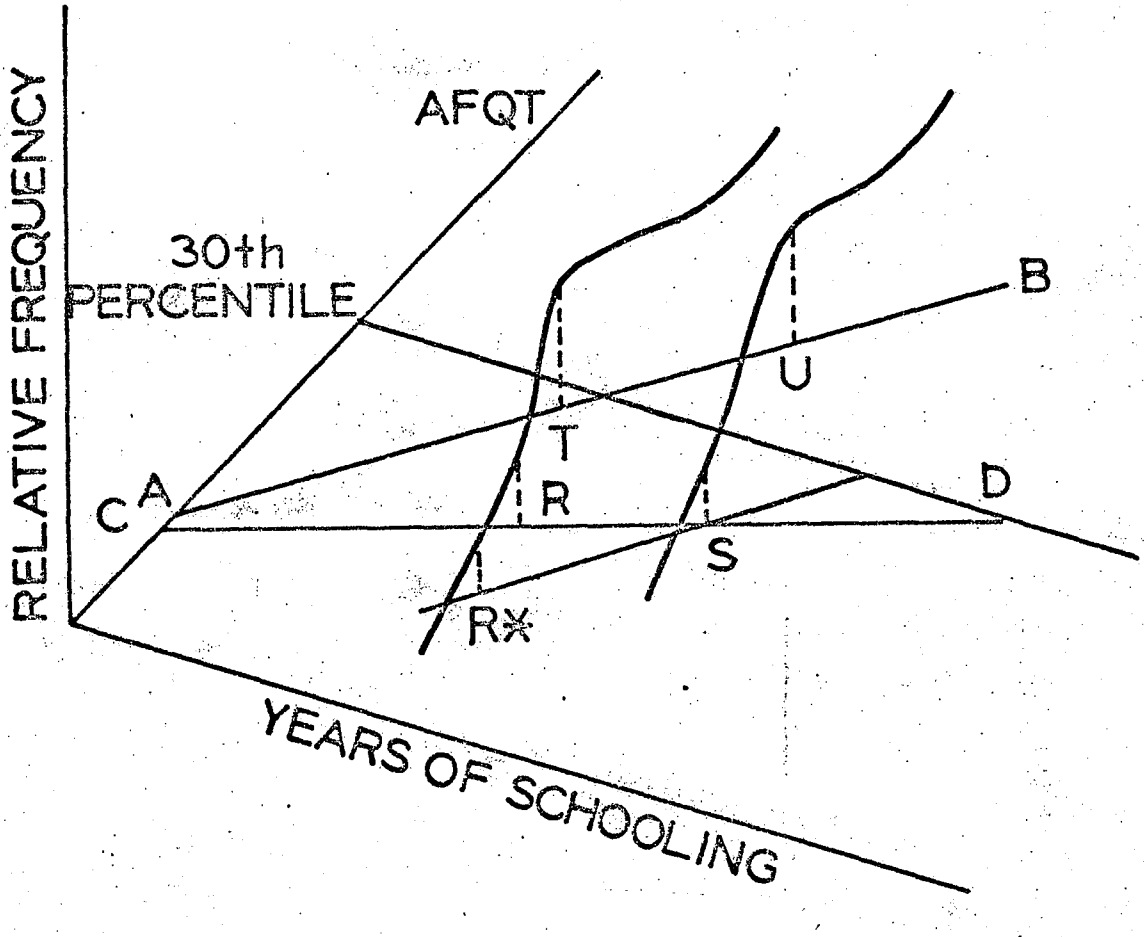


Figure 2

frequency distribution of scores for all high school graduates. All those observations to the left of the heavy verticle line are included in the low-achiever sub-sample. The average test score for high school graduates who are low achievers is S, and the average score for low-achieving dropouts is R. Therefore, the distance RS represents the HWS estimate of the effects on learning of the extra schooling. The effects of increased learning on earnings can be estimated with the same data (as done by HWS) and added to the effect of schooling on earnings that is independent of changes in AFQT scores.

Note that, if the higher overall AFQT scores of graduates and dropouts are entirely the result of their extra schooling, as is assumed by the HWS calculations, then the frequency curve for the full sample of high school graduates would have coincided with the curve for the dropouts had the high school graduates not finished high school. The average extra learning acquired by all high school graduates is therefore indicated by the distance TU. It would seem fair to assume that a high school graduate with score S would have ended up in roughly the same relative position on the curve if the graduates had not graduated and the graduate and dropout curve had coincided. In other words, we would expect him to have a score of R*, which is less than R, the average score of the low-achieving dropout. His actual gain in learning as a result of high school is therefore better measured by R*S, which is equal to TU.

Figure 2 puts the argument in the more appropriate terms of a linear regression. The line AB represents the regression relationship between years of schooling and AFQT scores for <u>all</u> individuals taking the AFQT test, and the line CD is the same relationship for the low-achiever

sub-sample, which is the type of calculation provided by HWS. The regression line for the low-achiever sub-sample will not only lie below the regression line for the entire group (because the high AFQT scores are all eliminated when dealing with the low-achiever sub-sample) it will also have a smaller slope since the percentage of observations excluded from the low-achiever sample is larger, the greater the years of school.[5] The normal curves of Figure 1 are superimposed on Figure 2, with the means of these distributions assumed to be directly above the regression line AB. The measured movement from R to S is now represented more generally by the CD regression line, while the movement from R* to S turns out to be parallel with the regression line for the whole sample.

The interpretation of all this is clear enough. The relationship between years of schooling and learning for low achievers may, in reality, be very much the same as it is for others, despite the results of the HWS regressions. If the true relationship between schooling and learning is the same for low achievers as for others, if there is also a linear relationship between learning and earnings, and if the independent effect of years of schooling (holding learning constant) is the same for all groups, then the return to education for low achievers would come out exactly the same as it does for others. All these conditions may not be satisfied exactly, but there is nothing in the HWS calculations that seriously undermines them. The estimate of financial returns to low achievers is clearly biased downwards, and the HWS calculations do not preclude the possibility that returns to low achievers are really about the same as they are for other groups.[6]

The rate of return for extra years of schooling, in other studies, comes out to be (most frequently) about 15% for schooling levels below college. Remarkably, those studies have indicated fairly small rate-of-return differences, at these schooling levels, among individuals from different regions of the country and of different races; yet average achievement levels for the South and non-South and for whites and non-whites are markedly different. The relationship between average achievement levels for various groups and the returns experienced from extra years of schooling is generally unimpressive.[7] This suggests that the exceedingly low returns calculated by HWS may be due chiefly to the peculiar stratification of their sample, which excludes all who have learned more than some arbitrary amount.[8] The rate of return to extra years of schooling for low achievers, reasonably defined and measured in the customary way, may be much closer to the 15% average than it is to the rate of return of well under 5% calculated by HWS.[9]

Important policy decisions might very well hinge on this issue. If, for instance, we are faced with the problem of allocating some given amount of extra educational resources among students of varying ability, the above analysis suggests (contrary to the HWS results) that the argument of "economic efficiency" cannot be used to justify disproportionate allocations to those of high ability. Furthermore, unless very large investments are being considered such that appreciable diminishing returns set in, concentrating new educational inputs among those who are faltering in school cannot be dismissed on efficiency grounds. Such concentration would surely be desirable on the grounds of equal educational opportunity and an improved income distribution, since those with low

measured learning are most often those disadvantaged by the low socio-economic circumstances of their homes and neighborhoods; hence, neutrality in terms of economic efficiency might indicate that new budget allocations should indeed be concentrated among "low achievers".

Note, however, that even though the rate of return to education for low achievers may be as high as for other groups and greater than any plausible discount rate, it is still quite possible that the costs exceed the economic benefits for available social policies aimed at increasing the amount of general education. First, augmenting the flow of students through additional years of schooling will usually involve either some supplementary costs (for counseling and the like) or lower learning gains for these marginal students. Weisbrod's well-known study of a model dropout-prevention program indicates that, once we take account of the extra costs required to reduce the dropout rate, the total cost of rescuing and educating a potential dropout may be well above the anticipated earnings gain.[10] Second, the portion of the HWS analysis which separates learning effects from the sheepskin of effect of years of schooling suggests strongly that simply forcing or bribing individuals through extra schooling, without assurance that learning takes place, will fail to have a satisfactory payoff rate.[11] Finally, other calculations indicate that simply spending more money on compensatory education or on additional amounts of standard school inputs also produces returns that are below costs.[12] Therefore the HWS conclusions that governmental efforts in the realm of general education have a lower financial payoff rate than training programs and yield financial returns that (when discounted) are less than costs are both probably correct, though for more complex reasons than presented in their article.

FOOTNOTES

[1]Although HWS do not have comparable data on training costs, the returns to training are sufficiently large that the conclusion on comparable payoff rates would seem warranted.

[2]See G.S. Becker, W.L. Hansen (1963), G. Hanoch, and F. Hines et al. for studies that indicate a significantly higher rate of return for individuals aggregated by geography, race, and various education levels. HWS make no explicit statements in their conclusion about comparative rates of return between low achievers and others, but their interest in such a comparison is stated as an opening theme of their article.

[3]AFQT scores are used as a proxy for learning.

[4]It would seem more valuable to have accurate estimates on school-age low achievers since this is when policy action is normally undertaken. It might be possible, however, to predict ahead of time who is likely to be a young-adult low achiever.

[5]We are assuming that the error term is (at least approximately) independent of the years of school.

[6]Other studies could easily fall into an error similar to that of HWS since the HWS data are not the only survey information concentrating on some group of the population that has not "made it". For example, the Survey of Economic Opportunity, which includes a disproportionate sampling from poor neighborhoods, is now being widely used for diverse purposes. If one were to apply standard regression techniques to calculate the payoff to education for the Survey's large sample of individuals living in poor neighborhoods, this procedure would lead to an underestimate similar to that of HWS.

[7]See Hanoch, Table 3, and Hines et al., Tables 2 and 4. In particular, note the following interesting results. Hines et al., find that, among males who have completed eight years of school, additional education through high school yields a higher rate of return for nonwhites than for whites. In addition, they find that, for education below college, the social rate of return is greater in the South than in other regions. Similar results are obtained by Hanoch. For those outside the South with eight years of school, he also finds that additional education through high school yields a higher rate of return for nonwhite than for white males. And at these schooling levels, he finds that white males earn a higher rate of return on additional education in the South than elsewhere. Therefore in these cases (which are among the most relevant for the HWS sample), the returns to education are higher for groups with lower scores on tests like the AFQT.

[8]There is also another reason why the returns calculated by HWS are relatively low. They assume that the earnings differential observed at ages 17-25 among individuals with different levels of education will simply stay the same through the rest of the individuals' working lives. This assumption is clearly out of accord with the consistently observed tendency for such differentials to grow appreciably throughout life. Other studies (see footnote 7) commonly use cross-section data, including individuals whose earnings are at a career peak, and often take into account secular growth in differentials due to increasing productivity. It follows that HWS' neglect of such adjustments is an added reason why their estimates of payoffs to education are lower than the results of most other studies.

[9]HWS do not calculate internal rates of return but rather discount returns by 5 and 10 percent. The five percent discount rate yields a present value of only one-half the lower-bound estimate of the costs of additional schooling, thereby suggesting an internal rate of return of less than 3 percent.

[10]See Weisbrod. In this study the earnings differentials between individuals with different levels of education, as reported in the Census, are used as the basis for the returns calculation. It is those same differentials that yield quite high rates of return when the extra costs of dropout prevention programs are not included in the estimate.

[11]A major conclusion of HWS, that schooling per se has less effect on earnings than does the learning associated with that schooling, is strengthened by taking account of the downward bias in their estimate of the effect of schooling on learning. This strengthening might actually be needed to fully preserve this conclusion, since schooling per se has a larger earnings effect than the associated learning than the HWS regression model where the training variable is excluded--a model which may be more appropriate for considering the relative effects of learning and schooling per se since a person's chances of selecting and/or being selected for training can be legitimately thought of as part of the benefit of either learning or schooling.

[12]See T. Ribich, Chapter 4 and Appendix C.

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