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Chapter Title: Appendix A: Problems in Measuring Education

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Appendix A: Problems in Measuring Education

In this appendix, we shall compare various possible measures of the quantity and quality of education. Since we are interested only in higher education, we shall restrict our discussion to this area, although much of the material is relevant for the lower grades. Suppose we begin by assuming that the quality of education is known, and that the problem is one of measuring quantity. The quantity of post-high school education could be measured in terms of years, courses taken or passed, number of days, or number of class hours. The ideal measure for our analysis is, of course, the one that exactly determines earnings. That is, if one more day of classes attended adds to income, we should measure education in days (Denison, 1964).

It is useful at this point to consider briefly the possible ways in which education may add to skills, since this may provide guidance in selecting a measure of quantity. Education can develop cognitive and affective skills.[1] Cognitive skills include reasoning and problem-solving ability and knowledge of particular abstract and applied subjects; affective skills include discipline, tolerance, and social poise. Consider the former aspect. Abundant evidence exists that schooling can teach some individuals facts and methods of thinking—two components of knowledge. While some attendance in class is probably necessary for gaining knowledge, much of the learning can be gained through homework and conversations with fellow students. Moreover, except perhaps for vocationally oriented knowledge, there need not be a close connection between knowledge gained and the length of the school year or number of courses,

[1] For an interesting discussion of these topics along with some partial tests for the relative importance of the two types of skills, see Gintis (1971).

because the difficulty of courses may be adjusted to the size of the average course load. This suggests that no quantitative measure of schooling is a very accurate gauge of the amount of knowledge gained through schooling. While such studies as Project Talent may eventually develop measures of both pre- and postcollege knowledge, there are no existing bodies of data that include this information as well as income. Consequently, years of schooling does not seem inferior to any of the other measures that have been suggested to represent the increase in cognitive skills.

Next consider the affective impact of education. Education can impart patterns of behavior that are useful in earning a living.[2] While one approach to teaching discipline (broadly defined) is through the carrot-and-stick method, it is not clear how many applications of the carrot-and-stick are necessary to accomplish the desired goal. Further, for attributes such as social polish and tolerance, it would seem that exposure to the college atmosphere is as important as the number of courses attended. Thus, in the absence of more direct measures of the affective output of education, years of schooling would seem to be a not unreasonable proxy.

As far as we know, there have been no empirical tests of the comparative performance of different ways of measuring education, such as those mentioned above. The measure we generally employ is the number of years of college completed; in order to measure the nonlinear effects of education on income, however, we use a zero-one dummy variable for each discrete possibility.[3]

Measuring the quality of education is also difficult. Differences in quality presumably should be interpreted as differences in educational output (received by an individual) for a given quantity of input. In order to implement this definition, educational output must be defined. Most investigators have defined this output in terms of knowledge gained from schooling as measured, for example, by aptitude tests (Bowles, 1970; Astin, 1968). Others have suggested that the major output

[2] In addition to creating these patterns, education may sort out people who do not have certain minimum acceptable levels of behavior. For example, those people who are "troublemakers" may be dropped from school.

[3] In some of our samples, vocational schools are included as a separate category.

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of education takes the form of better behavior and work habits (Gintis, 1971). Since it is not possible to find direct measures of output in samples with income data, it is common to use inputs as a proxy for outputs. The distinction between cognitive and affective outputs noted above may be important because different types of inputs may be required to produce them. That is, it is possible to find studies that rank colleges and even departments within colleges on the basis of the reputation of the teachers, teacher-student ratios, and facilities per pupil. Such measures may be appropriate for cognitive, but not for affective, output.

The problem is made more complicated because education can be specific or general. An education is specific if it is useful in only a small set of occupations. To the extent that only specific education adds to income, then the quality of this education only should be considered in our analysis. Much specific education is given in graduate schools; hence, for graduate students the quality of the undergraduate school may be irrelevant, while that of the graduate school is important.

A few studies have tried to adjust for the quality of schooling. For example, Weisbrod and Karpoff (1968) found that income earned after 15 years out of college by professionals and managers at American Telephone and Telegraph was related to the quality of their colleges.

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