EURAMERICA Vol.24, No.4 (December 1994), 79-98

The Market Value of Schooling in the U.S.: Implications of a Job-Based Theory of Wage Determination

Tony Tam

BACKGROUND

As an advanced capitalist economy, the United States has been powered by one of the most educated labor forces in the world. In spite of the recent uproar about the dismal state of the American inner city schooling system, the U.S. economy still relies on a well-educated labor pool. Indeed education may be more consequential to a person's life chances in the U.S. than in the developing world (Lin and Yauger 1975). Given the salience of education in the U.S., researchers and policy makers have been interested in the changing market values of schooling, that is, how the labor market rewards and prices different levels of schooling. The dominant empirical framework to measuring the value of schooling is driven by the human capital theory of education (Mincer 1974; Becker 1975). Central to this framework is the use of private return to schooling, defined in the context of a typical human capital earnings function (i.e. the relationship between log-

Professor Tony Tam, Department of Sociology, Harvard University, U.S.A.
I thank Jim Allen, Stan Lieberson, Peter Marsden, Aage Sorensen, and Chris Winship for helpful comments on an earlier draft of the paper and Ly-yun Chang for useful suggestions. Hoil Kim, Amy Luckey, and Steve Morgan provided valuable research assistance.

earnings and a person's schooling), as a measure of the changing market value of schooling in the labor market.[1] The concept of private return to schooling has also been applied to compare group differences in life chances and incentives for investing in schooling, and to understand the structure and processes in the labor market.

Under certain conditions, the private return to schooling coincides with the value of schooling. It is noteworthy that the return to schooling is the value of schooling from the perspective of the person whereas the market value of schooling is the value of schooling from the perspective of the market. For some important analytic purposes, such as comparing group differences in the labor market consequences of schooling, the market value of schooling is more revealing than the private return to schooling. As the next section argues, a job-based wage determination process and problems of matching are pervasive in the labor market. These two characteristics of the labor market render the perspectives of the person and the market incongruent: the return to schooling does not generally coincide with the market value of schooling.

The objective of this paper is twofold: First, to present theoretical reasons for the pervasiveness of discrepancy between the private return to schooling and the market value of schooling. Second, to reevaluate the market values of schooling in the U.S., as compared to the private returns to schooling, and to provide a preliminary comparison of the labor market outcomes of schooling for white males, white females, and four other minority groups in the United States.

Three disclaims should be made clear at the outset. First, neither the theoretical discussion nor the empirical analysis of this paper should be interpreted as a test of human capital theory. At issue is the wisdom of using the private return to schooling in a human capital earnings function to gauge the market value of schooling in a society. Second, the paper does not pretend to offer a new theoretical model. Rather, it applies an existing

---

1 Unless explicitly qualified, the phrase "returns to schooling" always refers to "private returns to schooling" in this paper. In the economics of education, the usual distinction is between private and social returns to schooling (see, e.g., Schultz 1993), with social returns including the private returns, the externalities of education for health, quality of children and so on, and the public subsidies for schooling.

theoretical perspective to derive a new approach to the problem of evaluating the market value of schooling. Third, the focus is not about refining the conventional human capital earnings function but about the proper measure of the market value of schooling.

THE THEORETICAL FRAMEWORK

Private Perspective versus Market Perspective

Human capital theory is an economic theory that emphasizes (a) the productive value of knowledge and training and (b) the lifetime implications of the opportunity costs and returns to investing in human capital accumulation (see, e.g., Rosen 1977; Willis 1986). One of the most important applications of human capital theory is to derive a precise model of the linkage between earnings and years of schooling under simple assumptions about the earnings determination process and schooling decisions (see, e.g., Mincer 1958; Becker and Chiswick 1966). The common form of the earnings function presented in the theoretical literature is as follows:

let	y	= log-earnings (or log-wages) for person i
and	SCH	= years of schooling completed by person i
then	y_i	$= b_0 + b_1 SCH_i + e_i$

which is a very general representation insofar as the individual heterogeneity (e_i) is left unspecified. We shall hereafter speak of this application of human capital theory simply as the HC model. The model will be extended to include observed covariates that produce systematic differences in expected earnings (or wages) across persons.

The coefficient of schooling (b_1) is what the literature called the return to schooling. Since it indicates the expected payoff to an individual for each additional year of schooling, the return to schooling is first and foremost a measure of the value of schooling to an individual. *If* the labor market compensates individuals for the schooling they invested in, as human capital theory argues, the private return to schooling is also a meaningful measure of the market value of schooling. More specifically, the return to schooling

reflects the *relative* market value of schooling because market value is now measured as a *ratio* between the expected increase in earnings from an additional year of school and the expectation under a given level of schooling.

The relationship between earnings/wages and schooling is, of course, dependent on assumptions about how earnings/wages are determined in the labor market. For a long time it seems a reasonable approximation to assume that the private return to schooling coincides with the market value of schooling. Two lines of research, when taken together, cast doubt on the equivalence of the private return to schooling and the market value of schooling.

A Job-based Theory of Wage Determination

Job competition theory (e.g. Thurow 1975; Sorensen and Kalleberg 1981) and the job allocation literature (e.g. Sattinger 1980) have stressed that earnings/wages are mostly attached to jobs rather than persons. This is a job-based theory of wage determination in the sense that an individual attains a certain level of wages because s/he occupies a specific job. The theory is now part of the mainstay of sociological and economic theories of the labor market (e.g. Sorensen 1990). Although the theory is originally developed to describe the wage determination process of internal labor markets (Dunlop 1957; Doeringer and Piore 1971) and never meant to be a universal theory of wage determination (see, e.g., Sorensen and Kalleberg 1981), it provides a good approximation to the reality of many jobs, especially white collar jobs. In the manufacturing industries in the U.S., for instance, much of the wage dispersion (including most of the gender wage gap) is between jobs (Groshen 1991; Petersen and Morgan forthcoming) rather than among individuals within job.[2]

---

[2] To the extent that wage determination in the U.S. labor market is a mixture of job-based wages and person-based wages, the discrepancy between the market value of schooling and the private return to schooling will be reduced and the conventional approach to measuring the value of schooling will be more tenable. For expository simplicity, this paper does not attempt to separate this scenario from the one with purely job-based wages. As will be seen, the results are consistent with the prevalence of job-based wages.

For this study, the most distinctive feature of the theory is the idea that the wage of an individual is a direct function of his/her job. Individuals of different characteristics may occupy the same job with essentially the same wage and individuals of the same characteristics can attain very different wages because of holding different jobs. Moreover, the wage of a job cannot be based on more than one level of schooling. To be sure, occupants of the same job may have different levels of education. If job-based wages are related to education in any way, the wage of a job can only be based on a specific level of schooling for the job. For the following discussion, this specific level of schooling will be called the *typical schooling of the job.*

The structure of wage determination is crucial to the validity of the private return to schooling as a measure of the market value of schooling. If wages are largely attached to persons as the HC model assumes, the market value of schooling is properly reflected by the private return to schooling irrespective of any dispersion of education within job. By contrast, if wages are attached to jobs as the job-based theory stresses, the market value of schooling cannot be the same as the private return to schooling unless all occupants of a job have identical levels of schooling. If educational dispersion is pervasive, as is known in the literature (e.g. Duncan and Hoffman 1981; Rumberger 1981), the private return to schooling will unlikely approximate the market value of schooling. The greater the educational dispersion, the worse the approximation.[3] The idea of job-based wages thus has the following implication:

P1. *The market value of schooling is different from the private return to schooling unless there is no educational dispersion within job.*

The job-based theory of wage determination does not imply whether there should be educational dispersion within job. A different literature in labor economics does give rise to such an implication.

---

[3] Indeed, prior research (e.g. Hartog and Oosterbeek 1988; Sicherman 1991) has indicated that the private returns to schooling are significantly different than, for instance, the returns to the schooling requirements of jobs.

Job Matching in the Labor Market

Fundamental to the job matching literature is the idea that the quality of match between jobs and persons is always problematic for both employers and employees (see, e.g., Mortensen 1988; Sicherman 1991). For instance, a new worker is typically uncertain about his/her own ability and the kind of job that will make the best use of it. Due to imperfect information for both sides of a match, the quality of matching is inherently variable across job-person pairs and is subject to *multiple determinants*.[4] Because of this multiplicity, an optimal match involves *tradeoffs* among the relevant determinants of the quality of a match. In other words, the attempt by employers and employees to optimize the quality of matching leads to the tradeoffs among the characteristics of an individual and among attributes of a job. For instance, a worker with less schooling than other workers on a job may be hired for his/her superior prior work experience, or special skills that can be proven to the employer. Conversely, a worker with higher schooling than other workers on a job may accept the job because the job provides useful training for future career development (Sicherman 1991).

Since the quality of a match depends on the tradeoffs among multiple factors, the schooling of occupants on a job will not be unique even when all matches are optimal.[5] Just as the level of schooling does not totally determine an individual's productivity, an individual's schooling is insufficient to determine the quality of a match. Even though the concept of typical schooling does not require an explicit model of optimization, we may construct a model in which typical schooling is the expected optimal level of

---

[4] While turnover behavior has been the motivation and focus of much of the job matching literature (e.g. Jovanovic 1979), the significance of the literature for this paper lies in the implication that the quality of a match is problematic and has multiple determinants.

[5] That the solution is not unique can be illustrated as follows. Let the quality (Q) of a match be a function of individuals' schooling (SCH) and a vector of other job and worker attributes (Z), that is, $Q = F(SCH,Z)$. For simplicity, assume F is a linear function, i.e.,

$$Q = a_0 SCH + a_1 Z.$$

For any level of quality Q, any combination of SCH and Z satisfying the following relationship will maintain Q,

$$SCH = (Q - a_1 Z)/a_0.$$

Thus, the schooling of a worker is but one of the determinants for the quality of a match and there is not a single level of schooling for an optimal match. *Thus educational dispersion does not imply any suboptimality.*

schooling for a job. The levels of optimal schooling (i.e. the schooling of an optimal individual for a job) should vary across individuals within an occupation.[6] Educational dispersion within job is therefore the norm, not the exception. The main implication of the job matching literature for this paper may be expressed as follows:

P2. *Educational dispersion within job is inherently pervasive in the U.S. labor market.*

A perspective of job-based wage determination therefore leads to the conclusion that, insofar as educational dispersion is pervasive, wages cannot be directly related to workers' schooling. However, human capital theory also implies that the market in need of educated workers must compensate workers for their investments in schooling. To the extent that both perspectives are valid, individual schooling and earnings must be related in some indirect way. To reconcile these theoretical predictions, then, *this paper postulates that some kind of typical schooling of the occupants of a job will mediate between wages and workers' schooling.*

This is admittedly a tentative hypothesis and we do not intend to uphold it on theoretical grounds. In fact, part of the purpose of the following empirical analysis is to examine the consequences of this working hypothesis by applying it to data analysis. It should be noted that the empirical model suggested by this hypothesis includes the conventional HC model as a special

---

[6] This conception of what constitutes the causally relevant schooling in wage determination represents a major departure from the much of the overeducation literature (e.g. Duncan and Hoffman 1981) where the minimum schooling requirement of a job is used instead of the typical schooling of a job. In general, the minimum schooling requirement is *suboptimal* even when schooling were the *only* determinant of the quality of a match. To see why this is the case, suppose individuals of higher schooling levels are generally more productive than those with less schooling on a given job. This assumption does not, however, imply that it is optimal to hire someone with the highest possible education. More educated individuals usually require higher wages for compensation. From the employer's viewpoint, the optimal choice will be to hire someone where the marginal cost of compensating for his/her schooling is equal to the expected marginal gain of productivity due to the additional education the individual has received. To be sure, it is not necessarily optimal to hire individuals with only the minimal schooling requirement of a job. Nor is it necessarily suboptimal to hire an individual with schooling less than the minimum schooling requirement for an occupation.

case. To properly estimate the market value of schooling when the private return to school is different from the market value of schooling, we have to measure the typical schooling of a job and separate its wage consequences from that of a person's own schooling. The discrepancy between the typical level of schooling in a job and the schooling of a particular worker will be correlated with some unobserved characteristics of a job or worker that are relevant to the tradeoffs in a job-person match. The next section will elaborate an analytic framework for this purpose.

DATA AND METHOD

Drawing upon the literature on a job-based theory of wage determination, Hartog and Oosterbeek (1988) have considered a more general statistical specification of the earnings-schooling relationship than the conventional specification of the human capital earnings function popularized by the seminal works of Becker and Mincer (Mincer 1974; Becker 1975).[7] In a similar spirit, we will examine a generalization of the conventional human capital earnings function. To derive more specific implications, this paper adds two fallible measurement assumptions, both of which are *conservative* in the sense that any measurement errors resulting from the assumptions will be unfavorable to the prediction of the theoretical perspective of this paper because measurement errors will bias the estimated market value of schooling toward zero.

A1. The central tendency of the distribution of schooling in a job reflects the typical schooling of the job.[8]

A2. After aggregating jobs to occupations, the typical schooling of an occupation is a close approximation to the typical schooling at the

[7] Sociological (e.g. Berg 1970; Sullivan 1978; Clogg and Shockey 1984; Shockey 1989) and economic (e.g. Freeman 1976; Duncan and Hoffman 1981; Rumberger 1981; Rumberger 1987; Sicherman 1991) research on overeducation has adopted similar specifications. This literature has, however, suffered from serious theoretical and empirical problems (see, e.g., Halaby 1994).

[8] Although we do not observe the typical schooling for a job, this assumption implies that we can estimate it from the empirical distribution of the schooling of individuals in the job.

job level (this is possible if jobs within an occupation are relatively homogeneous in their typical schooling).

These assumptions, in tandem with P1-P2, suggest a generalization of the conventional human capital earnings function.

According to the theoretical perspective of the last section, the crucial step toward measuring the market value of schooling under educational dispersion is to decompose an individual's schooling into (a) the occupational typical schooling (OTS) of the individual and (b) the difference between OTS and the individual's schooling (DEV), i.e. DEV = SCH - OTS. The basic structure of an earnings model will be:

$$y = c_0 + c_1 \, OTS + c_2 \, (SCH - OTS) + e$$

where y and SCH are defined as log-wages and years of schooling. This specification is more general than the HC model because it reduces to the HC model if the wage determination is directly based on an individual's schooling rather than attached to a job, and thus $c_1 = c_2 = b_1$. This model may be called the market value (MV) model.[9] Under either the HC model and the theoretical perspective of this paper, the return to the occupational typical schooling will always provide a measure of the market value of schooling. The coefficient of DEV, however, depends on the tradeoffs among multiple factors and thus the correlation between DEV and some omitted variables.[10] If there is any negative correlation (tradeoff) with an

---

[9] Notice that the MV model is mathematically equivalent to the following specification:

$$y = d_0 + d_1 \, OTS + d_2 \, SCH + e$$

Being equivalent, both models always have identical fit to the same data, and their coefficients are always convertible into each other. The interpretations of the coefficients, however, depend on which specification better represents the true structural process of wage determination. Under the MV model, for instance, we have $d_1 = c_1 - c_2$ and $d_2 = c_2$. The specification here should not be misinterpreted as a means of statistically separating the job-based wage mechanism and the person-based wage mechanism.

[10] Although the theoretical framework suggests that optimal matching involves tradeoffs on multiple attributes on both sides of a match, the market value (MV) model is not intended to model the complexity of this relationship. Instead, its simple goal is to provide a simple evaluation of the adequacy of the private return to schooling as a measure of market value.

omitted variable that has a positive wage effect, the coefficient of DEV will be biased toward zero when estimated with a standard regression model.

To be concrete, we shall consider two simple versions of the HC and MV models as follows:

$$(1)\ \text{Log } W_{ij} = \alpha_0 + \alpha_s\, SCH_i + \alpha_1\, EXP_i + \alpha_2\, EXPSQ_i + U_{ij}$$

$$(2)\ \text{Log } W_{ij} = \beta_0 + \beta_m\, MED_j + \beta_d\, DEV_{ij} + \beta_1\, EXP_i + \beta_2\, EXPSQ_i + U_{ij}$$

where W is hourly wages, SCH is years of schooling, EXP is labor force experience (computed as AGE - SCH - 6) and EXPSQ is EXP squared, MED is the median years of schooling of the occupation of a respondent (a measure of OTS), DEV is defined as SCH-MED (a joint characteristic of person and job), and U is the unobserved heterogeneity. Subscript i for a variable implies that the variable is a characteristic of individual i and subscript j for a variable implies that the variable is a characteristic of job j.

Although each model may be consistent with multiple theories, model (1) is primarily derived from the human capital theory of the earnings-schooling relationship. To derive the model from human capital theory, Mincer and others have implicitly assumed that the labor market directly attaches wages to individuals. The earnings-schooling relationship is the relationship between the earnings of an individual and his/her schooling. Model (2) is motivated by job matching and job-based wage determination.

Under the HC theory, models (1) and (2) are empirically equivalent. Since SCH = MED + DEV (SCH is, by construction, positively correlated with both MED and DEV), decomposing SCH into MED and DEV simply means that the effect of SCH is now mediated or reflected by both MED and DEV. If DEV does not involve any tradeoff in a job-person match, the population level coefficients of the additive components should be the same and equal to α_s. But this is a fallible hypothesis to be empirically tested. In contrast, the MV model allows for the possibility that the schooling effect on earnings is mediated by two concepts: the occupational typical schooling (OTS) and the deviation of the schooling of an occupant from OTS (DEV).

We therefore refrain from identifying the relationship between DEV and the unobserved attributes of either side of a match.

While model (2) is able to capture this possibility, the structure of model (1) is too restrictive to do so. Under the MV model, the two coefficients of MED and DEV need not be the same whereas the HC specification amounts to imposing an equality constraint on the two coefficients.

To be sure, the mere existence of educational dispersion within job does not tell us how serious the consequences may be for the purposes of estimating the market value of schooling. For this paper, the main concerns are the estimation of the relative market value of schooling and comparing market values of schooling across social groups. The consequences of educational dispersion is an issue that can only be empirically determined. The data to be used to assess the consequences is drawn from the modified 1970 Public Use Micro Sample file (ICPSR 7922) which is in turn derived from the 1/100 5% state sample of the 1970 U.S. Census, with an oversampling of nonwhites. I have selected only individuals over the age of 14 who have valid occupational codes, who are not self-employed, and who worked at least 35 hours a week. This file represents a 1/10000 sample of majority whites, 1/1000 sample of blacks, and 1/100 sample of Asians of Chinese, Japanese, or Korean origin.

To measure occupational typical schooling, this study uses the median years of schooling in an occupation. Since median is a robust estimator of the central tendency of a distribution, it is particularly suitable for our purposes given the high degree of skewness of the distributions of schooling within occupation. Median years of schooling for 3-digit 1970 occupations are estimated from the original 1/100 1970 PUMS file. As it turned out, about 33% are above the median schooling of other individuals in the same 3-digit occupations, and about 34% are below it. Moreover, the correlation between MED and SCH, as defined above, is only .58; that of MED and DEV is only -.02.

FINDINGS

The results are presented in Table 1. For the purposes of this paper, the main results are related to the size of the coefficients of MED (β_m) and SCH (α_s), and the pattern of estimated relative market values (β_m) across groups. Two types of significant tests have been conducted: the basic t-tests for the

coefficients in each regression, and the tests of interaction between groups and slope parameters. Overall, the findings show that the returns to schooling and relative market values of schooling are substantially different, and there are more and greater group variation in the relative market values of schooling than the returns to schooling suggest.

TABLE 1. REGRESSION OF LOG-HOURLY WAGES FOR SIX SOCIAL GROUPS IN THE U.S.

	A. WHITE MALES (N = 2989)		B. WHITE FEMALES (N = 1487)	
Variable	(1)	(2)	(1)	(2)
(Constant)	2.188	1.865	2.097	1.447**
SCH	.075		.073	
MED		.102		.123
DEV		.055		.023**#
EXP	.043	.042	.012**	.014**
EXPSQ/100	-.062	-.062	-.011**##	-.015**#
R^2	.180	.194	.071	.110
	C. BLACK MALES (N = 3877)		D. BLACK FEMALES (N = 2470)	
Variable	(1)	(2)	(1)	(2)
(Constant)	1.967**	1.487**	1.506**	.505**
SCH	.072		.102**	
MED		.116		.188**
DEV		.059		.045
EXP	.038	.038	.024**	.024**
EXPSQ/100	-.051	-.052	-.038**	-.039**
R^2	.120	.133	.132	.213
	E. ASIAN MALES (N = 1928)		F. ASIAN FEMALES (N = 1245)	
Variable	(1)	(2)	(1)	(2)
(Constant)	2.039	1.575*	2.219	1.200**
SCH	.074		.071	
MED		.111		.149**
DEV		.047		.023**
EXP	.049	.049	.014**	.021**
EXPSQ/100	-.068	-.070	-.019**#	-.034**
R^2	197	.225	.146	.231

Column (1): $\text{Log-W} = \alpha_0 + \alpha_s \text{ SCH} + \alpha_1 \text{ EXP} + \alpha_2 \text{ EXPSQ} + e$

Column (2): $\text{Log-W} = \beta_0 + \beta_m \text{ MED} + \beta_d \text{ DEV} + \beta_1 \text{ EXP} + \beta_2 \text{ EXPSQ} + e$

Variables

W Hourly wages: estimated by the annual earnings (1969) divided by the product of the number of weeks worked (1969) and the hours worked per week (1969).

SCH	Individual years of schooling.
MED	Median schooling of a 3-digit census occupation.
DEV	SCH - MED.
EXP	Individual years in labor force.
EXPSQ	EXP squared.

T-test for within-group regressions

#	Significant at .05 level but not significant at .01 level.
##	Not significant at .05 level.
	All other values are significant at .01 level.

T-test for interactions (equality of slopes across regressions)

**	Significantly different from white males at .01 level.
*	Significantly different from white males at .05 level.

Notes

1. The sample is drawn from the modified 1970 PUMS (ICPSR 7922) derived from the 1/100 5% state sample of 1970 U.S.Census. This file represents a 1/10,000 sample of majority whites, 1/1,000 sample of blacks, and 1/100 sample of other minorities.
2. Only people over the age of 14 who have valid occupation codes, who are not self-employed, and who work at least 35 hours a week are included in the sample.

The first set of results is obtained by comparing columns (1) and (2) in Table 1. Since the dependent variable is log-wages, a coefficient of .05 can be interpreted as follows: $(e^{.05} - 1)*100\%$ is interpretable as the percentage effect on wages for each additional year of schooling.[11] It is notable that the estimated β_m is 50% higher than the estimated α_s for white males, 60% for white females, over 60% for black males, 85% for black females, 50% for Asian males, and 110% for Asian females. The relative market values of schooling are very different than the private returns to schooling.

Second, while the estimated returns to schooling reveal remarkable homogeneity across groups, the estimated relative market values of schooling suggest much more heterogeneity. Except for black females (10.7%), all the estimated returns to schooling fall between 7.4% and 7.8%. By contrast, the estimated relative market value for black females is 20.7% whereas those of the other groups vary between 10.7% and 16.1%. Some group differences are therefore obscured by the variance in the estimated returns to schooling. In other words, comparing the market values of the occupational typical schooling across groups strongly suggest that *different groups have different*

[11] It is well-known that multiplying a small coefficient (e.g. less than .10) by 100 will give a good approximation to the real percentage effect.

proportions of jobs with a high (or low) market value on schooling. This is one of the most important applications of the MV model.

Third, by comparing the returns to schooling down column (1), one only finds the coefficient of schooling for black females to be statistically higher than that for white males. From column (2), however, the relative market values of schooling for both black females and Asian females are statistically higher than that for white males. Moreover, column (1) suggests that the return to schooling for black females is 36% higher than that for white males, but column (2) shows that the relative market value of schooling for black females is 100% higher than that for white males.

Fourth, even when the estimated returns to schooling are comparable across most groups, the baseline wages reflected by the constant terms vary much more significantly in column (2) than in column (1). That is, even when the returns to schooling are the same across some of the groups (e.g. white males vs. white females and Asian males), these groups still maintain significant group differentials in wage rates.

Fifth, the contrast between the conventional HC model and the MV model is most notable in the case of Asian females. Although the conventional model suggests little group differences between white males and Asian females in expected wages and in the returns to schooling, the MV model shows a much higher relative market values of schooling and a much smaller constant term for Asian females. Note that the constant term amounts to the expected wages of an individual with (by extrapolation) zero years of schooling and experience. The two findings together suggest that Asian women are more likely in occupations with low typical schooling and unusually low values on schooling. When Asian women enter occupations that have higher typical schooling and place normal relative market values on schooling, the relative market values of schooling will be higher than those of white males.

A similar situation occurs among black females. In fact, black females have the smallest constant term of all groups. That is, black females in occupations with low typical schooling have lower expected wages than other groups in occupations with equally low typical schooling. The result is one of the highest relative market values of schooling for black females.

Theoretically, then, both Asian females and black females should have the highest incentive for obtaining formal education.

CONCLUSION

The empirical relationship between earnings and schooling is a fundamental concern in stratification and labor market research. Empirical tests of alternative generating mechanisms of economic inequality have often made use of variation in the returns to schooling across social groups or economic units. Economists have long held an intrinsic interest in estimating the returns to schooling because of its central role in testing the human capital theory of economic growth, evaluating the supply and demand for education, and the estimation of social returns to public investments in schooling.

The starting point of this investigation is a conceptual distinction between the *private return* to schooling and the relative *market value* of schooling. The return to schooling essentially provides an evaluation of the value of schooling from the individual's perspective. While this view is certainly relevant for some substantive purposes, it is also important to determine the market values of schooling. This paper adopts a framework that takes serious account of the presence of structural educational dispersion within job. Under the market value perspective, however, educational dispersion within job does not necessarily mean inefficiency. Nonetheless, this paper argues that the dispersion of individuals' schooling about the occupational typical schooling has significant consequences for the estimation of the market values of schooling and for comparing the relative market value of schooling for different groups.

The empirical analysis indicates that, first, the extent of educational dispersion within job is serious because the private returns to schooling and the relative market values of schooling are markedly different, and the discrepancy renders the private returns to schooling a potentially misleading measure of the market values of schooling and an unreliable basis to compare across groups. Second, schooling is more *valuable* in the U.S. labor market than traditional estimates suggest because the private returns to schooling -- often used as a measure of the market values of schooling -- tend to

substantially understate the market values of schooling. Third, the market consequences of schooling in the U.S. are more *variable* across groups than conventional estimates have shown, and the typical labor market values of schooling appear to be very different for jobs attained by white males and by minority females. Given the large group differences between white males and minority females, further research on the reasons for the differences is warranted.

In conclusion, the return to schooling combines the market value of schooling and the wage consequence of deviating from the typical schooling of an occupation. The private return to schooling gives the individual's perspective on the value of schooling. For some purposes, such as the study of school continuation decisions, it is appropriate to evaluate the private return to schooling. For many other purposes, such as identifying group differences in the labor market consequences of schooling, it is useful to separate the market value of schooling and the effect of deviating from typical schooling. The findings suggest caution for the estimation of the market values of schooling in the U.S. and other countries. The private return to schooling is likely to be different from the market value of schooling and thus the returns to schooling may hide important group differences in their labor market outcomes.

For the purposes of this paper, we have not examined any alternative derivation of the market value model, nor searched for other explanations of the results. To be sure, the ultimate goal of the paper is to identify any substantive and empirical consequences of the market value model. Since the findings do suggest important consequences of the market value model, there is a great need for a definitive understanding of the market value model. In this paper, we have only considered and interpreted the market value model from a job-based theory of wage determination and the job matching perspective of employment relations. Future research should seriously examine other theoretical possibilities that are consistent with the findings of this paper.

REFERENCES

Becker, Gary S. 1975. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education.* Second edition. New York: Columbia University Press.

Becker, Gary S., and Barry R. Chiswick. 1966. "Education and the Distribution of Earnings." *American Economic Review, Proceedings* 56:358-69.

Berg, Ivar. 1970. *Education and Jobs: The Great Training Robbery.* New York: Praeger.

Clogg, Clifford C, and James W. Shockey. 1984. "Mismatch between Occupation and Schooling: A Prevalence Measure, Recent Trends, and Demographic Analysis." *Demography* 21:235-57.

Doeringer, Peter B., and Michael J. Piore. 1971. *Internal Labor Markets and Manpower Analysis.* Lexington, Mass.: D. C. Heath.

Duncan, Greg J., and Saul D. Hoffman. 1981. "The Incidence and Wage Effects of Overeducation." *Economics of Education Review* 1:75-86.

Dunlop, John T. 1957. "The Task of Contemporary Wage Theory." Pp. 117-39 in *New Concepts in Wage Determination*, edited by G. Taylor and F. Pierson. New York: McGraw-Hill.

Freeman, Richard B. 1976. *The Over-educated American.* New York: Academic Press.

Groshen, Erica L. 1991. "The Structure of the Female/Male Wage Differential: Is it Who You Are, What You Do, or Where You Work?" *Journal of Human Resources* 26:457-72.

Halaby, Charles. 1994. "Overeducation and Skill Mismatch." Sociology of Education 67:47-59.

Hartog, Joop, and Hessel Oosterbeek. 1988. "Education, Allocation and Earnings in the Netherlands: Overschooling?" *Economics of Education Review* 7:185-94.

Inter-university Consortium for Political and Social Research (ICPSR). 1981. *Census of Population and Housing [United States], 1970 Public Use*

Sample: Modified 1/1000 5% State Samples. [Document No. 7922]. Ann Arbor, Michigan: ICPSR.

Jovanovic, B. 1979. "Job Matching and the Theory of Turnover." *Journal of Political Economy* 87:1246-60.

Lin, N, and D. Yauger. 1975. "The Process of Occupational Status Achievement: A Preliminary Cross-National Comparison." *American Journal of Sociology* 81:543-62.

Mincer, Jacob. 1974. *Schooling, Experience and Earnings.* New York: Columbia University Press.

_____. 1958. "Investment in Human Capital and Personal Income Distribution." *Journal of Political Economy* 66:281-302.

Mortensen, Dale. 1988. "Matching: Finding a Partner for Life or Otherwise." *American Journal of Sociology* 94:S215-S240.

Petersen, T., and L. Morgan. (forthcoming). "Separate and Unequal: Occupation-Establishment Sex Segregation and the Gender Wage Gap." *American Journal of Sociology.*

Rosen, Sherwin. 1977. "Human Capital: A Survey of Empirical Research." Pp. 3-39 in *Research in Labor Economics*, vol.1, edited by R. Ehrenberg. Greenwich, Conn.: JAI Press.

Rumberger, Russell W. 1987. "The Impact of Surplus Schooling on Productivity and Earnings." *Journals of Human Resources* 22:24-50.

_____. 1981. *Overeducation in the U.S. Labor Market.* New York: Praeger.

Sattinger, M. A. 1980. *Capital and the Distribution of Labor Earnings.* Amsterdam: North-Holland.

Schultz, T. Paul. 1993. "Investments in the Schooling and Health of Women and Men." *Journal of Human Resources* 28:694-734.

Shockey, James W. 1989. "Overeducation and Earnings: A Structural Approach to Differential Attainment in the U.S. Labor Force (1970-1982)." *American Sociological Review* 54:856-64.

Sicherman, Nachum. 1991. "'Overeducation' in the Labor Market." *Journal of Labor Economics* 9:101-22.

Sorensen, A. B. 1990. "Throwing the Sociologists Out? A Reply to Smith." *American Sociological Review* 55:842-45.

_____, and A. Kalleberg. 1981. "An Outline of a Theory of the Matching of Persons to Jobs." Pp. 49-74 in *Sociological Perspectives on Labor Markets*, edited by I. Berg. New York: Academic Press.

Sullivan, Teresa A. 1978. *Marginal Workers, Marginal Jobs: Underutilization in the U.S. Work Force*. Austin. TX: University of Texas Press.

Thurow, Lester C. 1975. *Generating Inequality*. New York: Basic Books.

Willis, Robert J. 1986. "Wage Determinants: A Survey and Reinterpretation of Human Capital Earnings Functions." Pp. 525-602 in *Handbook of Labor Economics*, vol.1, edited by O. Ashenfelter and R. Layard. New York: North-Holland.

學校教育的市場價值：美國經驗資料的分析

譚康榮

摘要

本篇論文是以工作爲本位的薪酬理論 (job-based theory of wage determination)和勞力市場工作配對(job matching in the labor market)的觀點爲架構，建構出測量美國學校教育的相對市場價值的方法，並據此方法，使用從1970年美國人口普查修正樣本資料檔，分析並比較六個不同的性別和族群團體，所獲得之學校教育對其薪酬的影響。分析結果顯示：1．「學校教育對個人的回饋」迥然有別於理論上的「學校教育的相對市場價值」。由於兩者對薪資效果的歧異，使得採取「學校教育對個人的回饋」以測量學校的市場價值時，不僅在概念建構上仍有待商榷，而且誤導了學校教育對勞力市場中族群差異的估計；2．如果以「學校教育對個人的回饋」的概念來估計學校教育的市場價值時，所得之「學校教育的市場價值」的估計值會比較小。事實上學校教育在美國勞力市場上的價值要比這種傳統分析所顯示的要高；3．美國各族群之間在學校教育的市場價值上的差異，要比傳統方法所估計得來得明顯，尤其是白人男性和少數族群女性之間的差異是相當懸殊的。