# The Economic Payoff of Different Kinds of Education: A Study of Urban Migrants in Two Societies

**CHARLES A. LAVE**
**JAMES V. MUELLER**
**THEODORE D. GRAVES**

*Charles A. Lave is Associate Professor of Social Science at the University of California, Irvine; James V. Mueller is Assistant Professor of Economics at Alma College, Michigan; and Theodore D. Graves is at the South Pacific Research Institute.* *The Liberian research was done while Mueller was in residence at Cuttington College, Liberia, and was supported by a Ford Foundation Faculty Fellowship, and by a National Institute of Mental Health research grant to Lave. The Navajo research was conducted by Graves and associates under the auspices of the Institute of Behavioral Science, University of Colorado, and was supported by research grants from the National Institute of Mental Health and a Special Fellowship from the NIMH to Graves.*

INVESTMENT IN HUMAN CAPITAL, through education, is now generally recognized as an important potential source of accelerated national development in Third World nations. And on an individual basis, such investments are also a principal means by which people from traditional agricultural backgrounds are able to enter and succeed in the modern wage sector. The actual measurement of the economic returns generated by different kinds of education is, however, still a relatively open field of enquiry (see Mincer 1974; Psacharopoulos 1973; Thurow 1970; Zymelman 1971; and, for a current review of the literature, Blaug 1976). This paper is an attempt to add to the discussion by quantifying and comparing the monetary returns to these different kinds of education, using data on urban migrants in Liberia, and Navajo migrants in Denver.

We distinguish three kinds of education: (a) formal education—this is the kind of general education copied from the developed countries; (b) vocational education—this is education for a specific skill, done in something similar to a classroom setting; (c) informal training—this is the training people receive from their work experience, sometimes called "learning by doing." These three kinds of education represent important alternative choices for governments: Which kind should be provided directly by the government, or else encouraged through subsidy? And they represent important alternative choices for individuals: Given their differing costs and payoffs, which should the individual choose? From the viewpoint of either a government or an individual, the probable economic payoffs of these three alternative kinds of education must be known before a decision about them can be made. And from the viewpoint of the social scientist, knowledge of these differing payoffs should help us understand observed patterns of behavior (e.g., the high dropout rates in formal education may simply represent rational decisions by individual students that alternative forms of education offer a greater economic payoff).

Specifically, this paper calculates the economic payoff of formal education, vocational education, and informal training; and we also separate out the effects of job experience from the effects of simple aging (a subject of confusion in much of the literature). We do this for data on urban migrants to the city in two different societies: tribal migrants to the capital city of Liberia, in West Africa; and Navajo migrants from the reservation to Denver in the United States. Although the geographic and cultural distance between these two groups is substantial, the fitted models turn out to have similar structures: in both societies the returns to formal education show a "threshold" effect—there is no economic payoff to small amounts of education. In both societies, informal training—simple job experience—offers a substantial economic payoff; an individual with little formal education choosing between an extra year of formal education versus an extra year of job

experience would find that dropping out of school was a highly attractive alternative. In both societies, the returns to vocational education are very high, higher even than the returns to relatively substantial amounts of formal education. And in both societies we find a substantially nonlinear effect of age: the relation between salary and age being an inverted U-shape.

### *The General Model and Methodology*

The Liberian data are drawn from a larger set of comprehensive interviews with Monrovia immigrants.[1] For the purposes of this analysis, we have limited the sample to the 212 adult males who were born in rural areas and who currently have a full-time wage job. Table 1 summarizes their characteristics.

TABLE 1. CHARACTERISTICS OF 212 LIBERIAN WAGEWORKERS, 1971-73

| Variable | Description | Mean Value | Observed Range |
|---|---|---|---|
| Dependent Variable: | | | |
| ST$ | Starting Wage | $50.32/ month | $3-$175 |
| Education Variables: | | | |
| ED | Formal Education | 5.4 grades | 0-16 grades |
| VOC | Vocational Education | .49 years | 0-6 years |
| EXP | Informal Training (Job Experience) | 4.1 years | 0-34 years |
| Control Variables: | | | |
| AGE | Age When Hired on Current Job | 27 years old | 17-59 years |
| YR | Year Hired on Current Job | 1967 | 1950-73 |
| FB | Family Background | 21% nontraditional | 0-1 |

Although our primary interest is in calculating the economic payoffs to the three different kinds of education, we must consider a number of other variables as well. Three variables are also major determinants of starting salary, and, since they interact with the education variables, they must be included in our model in order to assure unbiased estimates of the education coefficients. The variables shown in Table 1 are the control variables which we have found to be important in our own prior work, which have proven to be important in the literature, and which our interviews with employers indicated to be important. We discuss their expected interrelationships below.

The dependent variable, starting wage (ST$), is measured in (U.S.) dollars per month.

Among the explanatory variables, ED represents formal classroom education in public and private (missionary) schools and is coded as highest grade completed. VOC refers to years of formal vocational education completed in programs sponsored by the Liberian government and private employers. We expect both ED and VOC to have direct, positive links with wages. We also expect ED to have an indirect impact on wages through VOC, since minimal literacy is a prerequisite for most of the vocational training programs.

EXP is the number of years of experience on prior jobs. We use this as a measure of skills acquired through informal training, or "learning by doing." J. Lave (1977) has recently shown that such experience produces not only job-related skills, but general cognitive skills (similar to those learned in school) as well. We expect a direct, positive relationship between EXP and wage.

To isolate the effects of our education variables from the other factors which might be operating on wage rates, we also include a number of control variables. The most important of these is the migrant's age (AGE) at the time he was hired into his current job. AGE is assumed to have a direct effect because employers presumably prefer and reward the stability, physical strength, or maturity of certain age groups. In addition, AGE has an indirect effect on wages through experience, since older men have had more time to acquire on-the-job skills. There is also a negative, indirect interaction between AGE and education: education has only become available to rural people in recent years, hence older employees will not have had as much opportunity to acquire it.

The second control variable, year hired (YR), will measure any secular trend in wages. If the Liberian economy is typical, starting wages will have shown a systematic increase over time, and YR will control for it.

The third control variable is family background (FB), coded as 1 if a respondent's father has worked predominately in the wage economy and 0 otherwise. This variable can be considered a proxy for various modern attitudes, values, and work habits that may have been acquired by growing up in a nontraditional household. This variable may also have an indirect effect on a migrant's wages by increasing his level of formal education. Children of nontraditional wageworkers usually start school at an earlier age and hence are further along in their studies when pressures arise to start a family and earn a living. Wage earners are also in a better financial position to support their children's continued schooling.

If our interest were in predicting a migrant's wages rather than in assessing the contribution of formal and informal education to those wages, many additional determinants could have been included (Graves and Lave 1972; Graves 1970; Lave and Mueller 1975). Since those variables we have employed elsewhere have neither a theoretical nor an empirical effect on the magnitude of the *educational* determinants, however, they have been excluded for simplicity of presentation here.

### *Fitting the Model to Liberian Data*

From our prior work with other groups, we expected that the wage effects of age and formal education might best be described by nonlinear functions. In the case of age, for example, we knew from our interviews that employer wage policies frequently discriminate against both very young and very old workers. Hence, we expected to find a hill-shaped relationship, an inverted U-shape, between age and wages. To allow for this possibility we included both AGE and $AGE^2$ in the regression. Specifying this function properly is particularly important because of the influence of age on EXP, and because of the strong negative interaction between age and education.

Both our interviews with employers, and our previous work on wage functions, led us to believe in the likelihood of a nonlinear relationship between wages and education, that, for example, the extra year of education between grades 11 and 12 was more important than the year between grades two and three. Accordingly, we tested two kinds of nonlinear functions which had been useful in our previous work: a "threshold" function and a cubic polynomial. The threshold model assumes employers do not reward small amounts of education; e.g., unskilled manual work is likely to pay a third-grade holder the same wage it pays a wholly uneducated employee. Only amounts of education which exceed this minimum threshold have any economic payoff, although there may be nonmonetary benefits for subthreshold amounts.

To find this threshold (if any), we defined and alternatively entered a number of ED variants, such as "grades of education greater than two," "grades greater than four," etc. We chose the form of the ED function which maximized the fit ($R^2$), holding all other relevant variables constant.

We also tried, and rejected, a cubic polynomial form of the education variable. Since it traced out almost the same shape as the threshold function, but used one more term, and did not fit quite as well, we concluded the threshold form was preferable. Furthermore, when we modeled the process which determines *current* salaries, it turned out that the identical threshold function again gave the best fit. Accordingly, we feel a reasonable degree of confidence in it.

Equation (1) shows the resultant fit, and to facilitate comparisons, the calculated effects of the education variables are tabulated in Table 2.

The results in Table 2 indicate that the ST$ value of formal education falls into three distinct ranges. For zero to two grades of schooling there is no monetary effect. Migrants in this group are apparently competing for the same group of jobs and are receiving no differential treatment on the basis of their minor differences in schooling. For three to ten grades, each year of additional education is worth an extra $2.18 per month to the migrant who obtains it. For 11 to 16 grades, each year in this range becomes progressively more valuable than the year before.

TABLE 2. ECONOMIC PAYOFF TO DIFFERENT KINDS OF EDUCATION (LIBERIA)

| Years of: | Formal Education | Informal Training (Experience) | Vocational Education |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 0 | $ 1.03 | $ 7.19 |
| 2 | 0 | 2.06 | 14.40 |
| 3 | $ 2.18 | 3.09 | 21.60 |
| 4 | 4.36 | 4.12 | 28.80 |
| 5 | 6.54 | 5.15 | 36.00 |
| 6 | 8.72 | 6.18 | 43.10 |
| 7 | 10.90 | 7.21 | — |
| 8 | 13.10 | 8.24 | — |
| 9 | 15.30 | 9.27 | — |
| 10 | 17.40 | 10.30 | — |
| 11 | 22.40 | 11.30 | — |
| 12 | 33.10 | 12.40 | — |
| 13 | 49.40 | 13.40 | — |
| 14 | 71.30 | 14.40 | — |
| 15 | 98.80 | 15.50 | — |
| 16 | 132.00 | 16.50 | — |

Calculated from equation (1). For example, column is the sum of the ED > 2, and $(ED > 10)^2$ effects.

Each additional year of informal training (EXP) contributes $1.03 per month to the migrant's starting wage. Each year of skill-specific, vocational education (VOC), adds $7.19 per month, making it roughly seven times more productive than a year of simple job experience.

The high estimated productivity of VOC should not be surprising: in many cases, it involves training done by an employer to teach job skills the employer has already decided are valuable. However, a small part of this $7.19 effect is probably due to preselection of unusually well-qualified individuals in the first place. Offering the same opportunity to all migrants would probably produce lower returns. It should also be remembered that entry into such training usually requires a minimum amount of prior general education, meaning the two are often complements rather than strict substitutes. Still, even with these qualifications, it is evident that skill-specific education is an important alternative to general education, from the viewpoint of society.

From the individual's point of view, we might want to compare two different alternatives: Shall I go to school for one more year (general education) or shall I instead acquire a year of work experience (informal vocational training)? In Table 2, general education at first appears to be the better alternative, though barely so. A migrant who has acquired four years of general schooling adds slightly more to his ST$, $4.36, than he could have obtained by spending those same four years in some sort of wage work, $4.12. Of course, many pupils are too young to get and keep a

job during the period of their schooling. For them, work experience is an unavailable alternative. But for an individual with a *choice* between ED and EXP (that is, one old enough to be employable), the small salary differentials in the three to ten grade range are almost certainly not enough to compensate him for his school expenses and for the income foregone while in school. In other words, choosing the additional year of general education appears to be the better alternative only if the opportunity costs of obtaining it are ignored (or are zero).

In strictly monetary terms, it is only in the later grades that education really begins to pay off. But most migrants never get the chance to approach this level; the average educational achievement of our sample is only 5.4 years. This is probably because rural children typically have not begun school until the age of 12–14.[2] Hence, potential male migrants often have completed no more than four or five grades by the time they are 17, and so can be tempted by wage work.

Turning now to the coefficients of the background variables, we can see that they behave as expected. The fitted AGE quadratic shows the expected age "hill": it peaks at age 36 and then declines.

The coefficient for the YR variable implies a positive annual time trend of $1.16 each year over the period covered by the survey (the earliest hiring date is 1950, but most were employed after 1960).

The extremely small coefficient for FB (family background) rules out any direct causal path to wages. However, when the education function is deleted from the equation (not shown), the FB coefficient becomes much larger and is statistically significant, thus verifying the hypothesized indirect path through ED. Apparently, growing up in a nontraditional household strongly influences the amount of education a migrant has received but otherwise has no direct impact on money wages.

In all, our model seems to fit the data quite well. The expected relationships have been verified with a substantial degree of confidence, and the .37 $R^2$ is above average for cross-sectional data analyses of this type.

### *Current Wage Effects*

We have given primary attention to the starting wage equation because the initial experience of migrants is frequently crucial in determining whether they stay in the city. In addition, starting wage is the single most important determinant of current wage. (Once a migrant is hired, his initial wage and job classifications frequently predetermine subsequent raises, particularly in white collar work.) Still, fitting an equation with current wage as the dependent variable can provide a cross-check on the starting wage results and gives us a chance to measure the effects of additional work experience gained on a migrant's current job.

The results of fitting a current wage equation to Liberian data were very similar to those found in Equation (1). The threshold education function again provided the best fit to

$$\begin{aligned} ST\$ = &- 107 + \underset{(3.7)}{2.18ED{>}2} + \underset{(4.5)}{2.82(ED{>}10)^2} + \underset{(4.1)}{7.19VOC} + \underset{(2.8)}{1.03EXP} \\ &+ \underset{(0.2)}{.547FB} + \underset{(4.5)}{4.27AGE} - \underset{(4.1)}{.0593AGE^2} + \underset{(3.0)}{1.16YR} \qquad (1) \\ R^2 = .37 \quad &\text{(t-values in parentheses)} \quad N = 212 \end{aligned}$$

the data, with the same threshold values of two and ten grades working best. We also observed the same sorts of trade-offs between formal and informal education. Age showed the same "hill" shape and peaked later, at age 38. Years of experience on the current job tended to have about the same impact on wages as years of experience on former jobs. For older migrants who have been able to stay on their present jobs, additional years of current experience keep their wages rising through age 51. Beyond this point, the negative influence of added age overcomes the positive value of added tenure and wages decline.

### *Fitting the Model to Navajo Data*

Having developed a relatively successful model for Liberian data, we decided to see if it could be applied to another country. These new data, concerning Navajo who migrated from their home reservation to Denver, were collected for a quite different purpose and so do not contain identical variables.[3] However, the variables are close enough, in most cases, to make for an interesting comparison. We are not arguing that Navajo migrants have a similar culture to Liberian migrants, nor that Denver and Monrovia (Liberia) are identical. However, both groups of migrants have the same three kinds of education, and an analysis of the relative values of formal, vocational, and informal education is equally of interest in both societies. As it turns out, the structure of the wage determination process is similar in both societies, which lends support to the value of our results.

Table 3 shows the relevant characteristics of our Navajo sample. With the exception of the vocational training variables, the basic variables are coded in the same way. Our Navajo vocational training data are only available as a three-level variable (no training, semiskilled training, skilled training) rather than as years of training; we therefore converted this variable into two dummy variables, MIDVOC and HIVOC.

We again experimented to discover the best form of the ED variable and again discovered that a threshold function produced the best fit, although this time the shape turned out to be simpler. Equation (2) shows the resultant fit, and Table 4 tabulates the effects of the education variables.

A comparison of Tables 2 and 4 shows an essentially similar process at work, although there are differences in

$$ST\$ = 349.74 + \underset{(5.9)}{22.10}ED>10 + \underset{(3.5)}{36.89}HIVOC + \underset{(0.4)}{4.52}MIDVOC + \underset{(2.4)}{5.92}EXP$$

$$+ \underset{(1.2)}{9.40}FB + \underset{(1.6)}{7.92}AGE - \underset{(2.1)}{0.18}AGE^2 - \underset{(2.3)}{3.76}YR \qquad (2)$$

$R^2 = .251$ (t-values in parentheses) $N = 240$

degree. For formal education, we find the same sort of threshold process we observed in the Liberian data, but the minimum is elevated; at least 11 years of education are required before any discernible payoff appears, compared to a threshold of three years in Liberia. This higher value is an expected result, though, given the much higher education level of the labor force in Denver. (With well-educated nonmigrant job applicants in abundance, Denver employers simply do not respond to differences in education until the migrant has more than ten grades. At this point, each extra year of ED begins to add a linear $22 to monthly starting wages.)

Work experience carries the same relative value in both societies. In both cases, an extra year of EXP represents about 2% of the average ST$, a small but significant contribution. While the initial education threshold is higher in Denver, prospective Liberian and Navajo migrants still face the same sort of trade-off between formal education and on-the-job training. Again in strictly monetary terms, the sixth-grader contemplating the choice between three more years in school and three years of working on or near the reservation clearly does better to choose the latter. The large number of returned migrants have undoubtedly passed on the information that formal education does not seem to matter much in Denver until you have a lot of it. In this light, a decision to drop out of school as soon as one is of employable age would appear rational.

TABLE 3. CHARACTERISTICS OF 240 NAVAJO MIGRANTS IN DENVER, 1963-65

| Variable | Description | Mean Value | Observed Range |
|---|---|---|---|
| Dependent Variable: | | | |
| ST$ | Starting Wage | $239 | $110-$470 |
| Education Variables: | | | |
| ED | Formal Education | 7.8 grades | 0-15 grades |
| HIVOC | % Completing Skilled Vocational Education | 42% | 0-1 |
| MIDVOC | % Completing Semiskilled Vocational Education | 42% | 0-1 |
| Control Variables: | | | |
| AGE | Age When Hired on Current Job | 22 years old | 18-49 years |
| YR | Year When Hired on Current Job | 1962 | 1950-1965 |
| FB | Family Background | 40% nontraditional | 0-1 |

TABLE 4. ECONOMIC PAYOFF TO DIFFERENT KINDS OF EDUCATION (NAVAJO)

| Years of: | Formal Education | Informal Training (Experience) |
|---|---|---|
| 1 | 0 | $ 5.92 |
| 2 | 0 | 11.84 |
| 3 | 0 | 17.76 |
| 4 | 0 | 23.68 |
| 5 | 0 | 29.60 |
| 6 | 0 | 35.52 |
| 7 | 0 | 41.44 |
| 8 | 0 | 47.36 |
| 9 | 0 | 53.28 |
| 10 | 0 | 59.20 |
| 11 | $22.10 | 65.12 |
| 12 | 44.20 | 71.04 |
| 13 | 66.30 | 76.96 |
| 14 | 88.40 | 82.88 |
| 15 | 110.60 | 88.80 |

Calculated from equation (2).

Turning to the vocational education variables, we see that HIVOC is statistically significant and relatively large. Its contribution to salary is almost as great as that of 12 years of formal education. MIDVOC is not significant though, which probably reflects the relatively low level of training involved. (An additional factor here is the very low proportion of migrants who managed to find jobs in the areas of their training.)

The control variables follow about the same pattern as in the Liberian data: FB is not significant when ED is in the equation, but does become significant when ED is removed, again indicating that the primary effect of FB is the determination of years of schooling. Both terms of the AGE quadratic are significant; again indicating that the relationship between AGE and wages is hill-shaped. $R^2$ is lower, though still quite respectable for this sort of data. The lower value is probably due to the reduced importance of formal education in this sample, i.e., in Liberia there were many migrants with sufficient education to help explain their wages, while among the Navajo almost no one has post-threshold amounts of education.

## *Summary*

We have been concerned with measuring the relative economic payoff to three different kinds of education: formal-general, formal-vocational, and informal on-the-job. Our results are strikingly parallel across the two societies.

In both cases we find that there is a substantial threshold effect for formal-general education. Amounts of education below this simply have no economic payoff to the individual. In both societies, the measured value of informal on-the-job training is substantial and is greater than (even) large amounts of formal education. Hence, from the viewpoint of an individual student deciding between another year of formal-general schooling versus a year of work experience, it is quite rational to drop out of school, unless he is certain of obtaining a very substantial total amount of formal education, which undoubtedly explains the high dropout rate in these countries. Likewise in both societies the individual economic payoff of vocational education is much higher than the payoff of formal-general education, unless the individual is certain of obtaining a very substantial amount of formal education.

From the viewpoint of government investment in education, we are led to question the apparent policy of providing low levels of formal-general education for everyone, rather than assuring that some people obtain substantial amounts of it. There may, of course, be very significant nation-building returns to universal low-level education, however. The findings on the relatively high payoff to formal vocational education probably indicates that at least some redirection of government spending in this direction is justified.

Finally, we have found a basically similar wage determination process in two widely separated development settings. In terms of overall fit, the variables which are important in determining wages among Monrovia migrants do almost as well in explaining relative economic success in Denver. Moreover, specific comparisons of the key wage-education relationships show similar shapes and similar trade-offs in both locations.

## *NOTES*

[1]They were collected in 1971–73 by two African-born college graduates, Michael Dinobi and Vincent Okafor, and are essentially a random sample of Monrovia migrants. The sample is not quite perfect because we ran out of money before the entire project could be completed. However, it is more than adequate for the regression estimates we plan here.

[2]Raising the $20–$40 required to send a child through a year of school is still a difficult task for a subsistence rice farmer, and few have been willing to risk this sum until their sons have passed through traditional initiation rites and accepted the responsibilities of adulthood.

[3]The Navajo data were collected under the supervision of Graves in 1963–65 and represent an essentially complete interview of all Navajo male heads of household then living in Denver (N = 124), plus 135 migrants interviewed after their return to the reservation (essentially a one-third random sample of all Denver returnees).

## *REFERENCES CITED*


Blaug, M.
1976 Human Capital Theory: A Slightly Jaundiced Survey. Journal of Economic Literature 14(3).

Graves, Theodore D.
1970 The Personal Adjustment of Navajo Indian Migrants to Denver, Colorado. American Anthropologist 72: 35–54.

Graves, Theodore D., and Charles A. Lave
1972 Determinants of Urban Migrant Indian Wages. Human Organization 31(1): 31–47.

Lave, Charles A., and James V. Mueller
1975 The Economic Success of Tribal Migrants in Liberia. *In* Formal Methods in Economic Anthropology, S. Plattner, ed. Washington, D.C.: American Anthropological Association.

Lave, Jean
1977 Cognitive Consequences of Traditional Apprenticeship Training in West Africa. Anthropology and Education Quarterly 8(3):177-80.

Mincer, J.
1974 Schooling, Experience, and Earnings. New York: National Bureau of Economic Research.

Psacharopoulos, G.
1973 Returns to Education, and International Comparison. San Francisco: Jossey-Bass.

Thurow, L. C.
1970 Investment in Human Capital. Belmont, Calif.: Wadsworth.

Zymelman, M.
1971 Labour, Education and Development. *In* Education in National Development, D. Adams, ed. New York: McKay.