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Investments in Human Capital and the Poverty Transition

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INVESTMENTS IN HUMAN CAPITAL AND THE POVERTY TRANSITION

I. Introduction

In 1990, almost 34 million people were living below the government's official poverty level (Hoffman, p.395). That represents 13.5 percent of the total population, or more people than live in the state of California. Thus, it should be obvious that the plight of the poor is one which warrants serious concern on all levels - political, social, and economic. Unfortunately, the question of how to alleviate this dreadful problem is one that has long perplexed even the most brilliant of minds.

Of even greater concern is the fact that the number of children living in poverty increased by 22 percent in the eighties (Hoffman, p. 395). Moreover, the 1991 census report revealed that there are more impoverished children in America than at any time since 1965 (Whitman, p. 43). It has been said that the children are the future, but past research has indicated it may not be a bright one. Noted economist Gary Solon determined the intergenerational correlation in long-run income to be at least .4, indicating limited chance of upward mobility (p. 393). Also, other research has found "parental income (especially parental poverty), race, and parental and community welfare use to be especially strongly associated with children's economic outcomes" (Corcoran, p. 366). Unfortunately, these are all things out of the control of the youths themselves.

On the other hand, economic theory suggests that an important strategy in moving youth out of poverty is to increase their earnings

potential by "investing" in their stock of human capital. It is these "investing" decisions over which youths have the most control. Young people have no say in what conditions they are born into, the minimum wage, or welfare programs. But they do have a definitive say in their decision to seek higher education, enroll in vocational training programs, or enlist in the military. Thus, it is important to study these different strategies to determine which one gives impoverished youths the best chance to move out of their dire situation.

Using the National Longitudinal Survey of Youth (NLSY), this paper will explore the various strategies within the context of the human capital economic model and determine the effects of each on youth's probability of making the transition out of poverty. This data base is particularly well-suited to the research in that it surveys a large sample of youth aged 14-17 in 1979 and traces them through the year 1991. Thus, it will be possible to follow each youth's investment decisions over this time period. A regression model will then be developed to estimate the effects of various human capital investment strategies on the probability of moving out of poverty when controlling for ability and a set of background variables. It is hypothesized that formal education will prove to be a powerful predictor of the poverty transition.

II. The Human Capital Model

Bill Clinton's campaign for presidency helped to bring the idea of human capital into the spotlight. A primary aspect of his economic plan was to boost the economy by focusing on improving the workforce. This was in sharp contrast to the policies of the last twelve years, which emphasized the private sector and policies to spark physical capital

formation. To better the quality of the American worker, Clinton's plan calls for more and better education, more on-the-job training, greater access to college, etc. The effects of such a scheme on the macroeconomy have been well documented (see Farrell, p. 89; Blinder, p. 14). However, the effects on the microeconomic level are still a matter of conjecture (see Sawhill, p. 1092-96). Specifically, will more and better access to the various forms of human capital investments increase the chances of a poor youth making the transition out of poverty? If so, which of the investment possibilities offers the best chance of doing so?

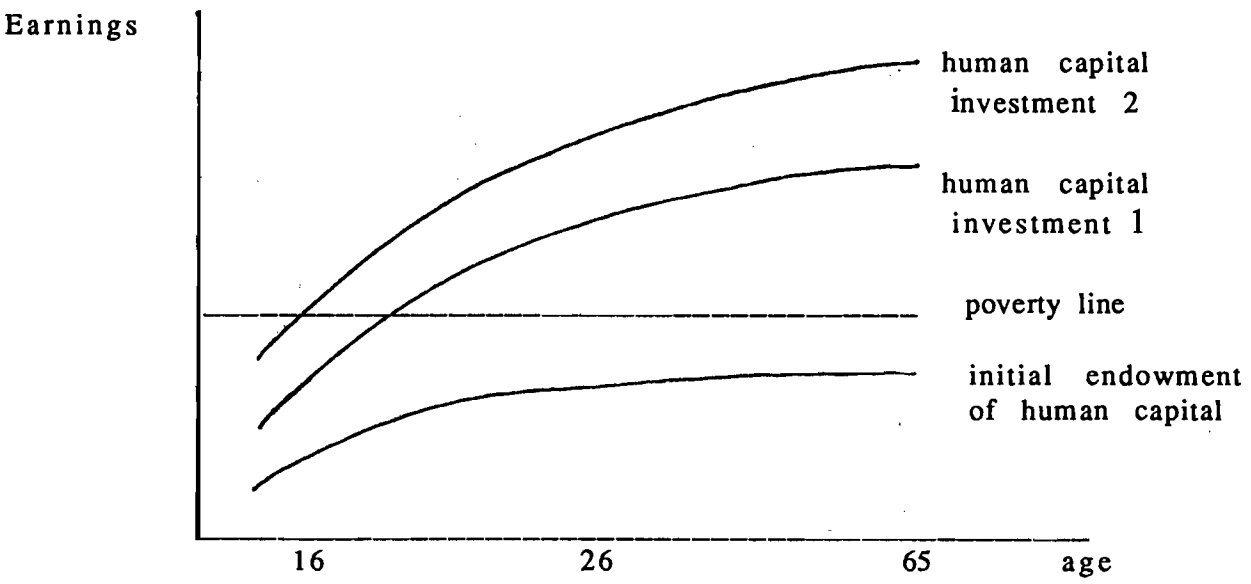
The concept of human capital was first proposed by Gary Becker. The model is based on the idea that workers embody a set of skills that can be "rented out" to employers. Ronald Ehrenberg continues, "the knowledge and skills a worker has - which come from education and training - generate a certain stock of productive capital" (p. 279). This productive capital is valued by the amount these skills can earn in the labor market.

To be certain, there are many ways in which workers (or potential workers), can educate themselves in order to enhance their earnings potential. They can receive formal education through any level - grade school, high school, junior college, or four year university. They can enroll in trade school or a technical institute. They can enter an apprenticeship program, gain practical knowledge in the military, or acquire skills on the job (Ehrenberg, p. 301). Specific choices are based upon what individuals deem to be the benefit of any such decision. The point is that everyone does in fact have a choice.

At the same time, the formative years of a youth's life will often present situations which will have a negative impact on the potential to

earn in the future. Such unfortunately commonplace problems as substance abuse, criminal activity, and teen pregnancy may limit the ability of leaving poverty for differing reasons. It could be that these things make a youth less marketable or decrease the likelihood of investing further in positive human capital investments. For example, a person with a criminal record is probably less desirable as an employee. Perhaps a teenage girl who gives birth will feel she has no time to pursue more education. A realistic model of poverty transitions will control for factors such as these, as well as direct measures of investment in human capital.

It is hoped that a poor youth would choose the path which (legally) provides the best chance of leaving poverty. To illustrate, consider the following graph, developed for this research from the human capital theory:



The vertical axis represents earnings, while the horizontal axis represents age. Recall that any given person, throughout his/her lifetime has several human capital investment decisions to make. The lowest line on the graph represents the smallest possible level of human capital, the initial endowment. This line, for ease of categorization, may be broadened to include lower levels of education. This initial endowment does have some value in the workplace. Given the person's endowment, this line, as well as the others, is upward sloping to reflect the high correlation between age and experience. The initial position of this line is primarily determined by such things as ability and motivation. However, for a poor youth, this is generally not enough to ensure exiting poverty status as an adult. To better the chances, though, a youth can choose to pursue further human capital investments - perhaps a high school diploma. This would bring the youth to a higher graph, such as the one labeled "human capital investment 1". Such an investment would subsequently increase their earnings potential.

Of course, the youth does not have to stop at just this level of human capital investment. He may choose to pursue further options, such as junior college or trade school. This would increase the earnings potential even further and bring him to an even higher graph. This is represented by the one labeled "human capital investment 2". The more and more the youth invests in human capital, the greater his earnings potential becomes. A "negative investment", such as drug abuse, would have the effect of moving a youth to a lower level.

The other integral aspect of this graph is the actual poverty line. After all, the ultimate result of any human capital investment decision on the poverty status of the individual is highly sensitive to the initial

position of the earnings curve relative to the poverty line. To clarify, it is possible for a very poor person to double their income but still be officially poor. Another person may receive a minimal raise in pay and no longer be below the poverty line.

There are also other occurrences that will create a shift in the poverty line. These include the expanding of an individual's family size through marriage or having children. The government could alter the official definition of poverty, which may also cause a shift in the poverty line. In that the goal of this research is to predict a person's economic standing after ten years relative to the nominal poverty line, it is important to remember that the line's position can change.

Thus, this simple model is able to represent the movement from one earnings curve to the next given investments in human capital. What the model is not able to show is which of the human capital investment strategies provides the greatest earnings potential, or in turn, the best chance of making the transition out of poverty. In effect, that is the primary concern of this research paper: to study and rank the effects of various human capital investment decisions on the transition out of poverty for youth. Of particular interest will be the effectiveness of formal education in moving youths out of poverty.

III. Research Design

The effects of several potential human capital investments on poverty status will be analyzed and compared using descriptive and logit methods. The data employed in the model will be based on findings of the National Longitudinal Survey of Youth (NLSY). The dependent variable of the model will be poverty status in the year 1990. It will be measured on

a "yes or no" basis. Only those respondents who were poor at the start of the survey in 1979 are followed. Thus the empirical model will attempt to predict the transitions out of poverty in the year 1990 for those who were poor in 1979.

Using this sample of youths, an array of descriptive statistics will be presented to establish significant relationships between various measures of human capital and poverty status in 1990. The sample is also broken down by race and gender and descriptive statistics presented for each group to determine if there are any differential effects of the human capital variables across these groups. This should provide some insight into likely results of the logistic regressions.

The next step will be to employ a logit model to test hypotheses about the effects of selected human capital variables on transitions from poverty. The logit is more satisfactory than the simple descriptive statistics because it allows for the testing of the effects that educational attainment and other human capital variables have on poverty status in 1990 after controlling for other variables. Furthermore, logit is specifically designed to predict dichotomous variables and, thus, is superior to the OLS.

The third step of the research design is to develop a spreadsheet model to predict the actual probabilities that individuals with certain characteristics will escape poverty. The effects of additional years of education will be the primary focus of this analysis.

IV. Dependent Variable

The dependent variable of the model is poverty status in 1990. This is an absolute value measured using the government's official definition of

poverty. Sheldon Danziger explains how the government measures poverty:

> The official definition of poverty is a function both of family income and of family size. In 1986, the poverty line varied from $5,701 for a nonelderly single person, to $11,203 for a family of four, to $22,497 for a family of nine or more. A family of a given size is counted as poor if its cash income from all sources during a calendar year falls below its poverty line. Income, summed over all related persons in the family, includes wages and salaries, net income from self-employment, Social Security and other social insurance benefits, cash welfare benefits, interest, dividends, net rental income, private pensions, child support, alimony, and so forth.
>
> The official poverty measure does not include capital gains, imputed rents, or noncash government or private benefits (e.g., food stamps, housing subsidies, Medicare benefits, etc). Nor does it subtract taxes, although all of these omitted items affect a family's living standard ... The official poverty lines are updated yearly to account for changes in the Consumer Price Index so that they present the same purchasing power each year (p. 145).

For certain, this is not a perfect measure of the economic standing of an individual. In fact, its problems are well-documented (see Sawhill, p. 1075). However, for the purposes of this research, it is acceptable.

V. Independent Variables

The independent variables selected for inclusion in the model are based on the suggestions of many articles reviewed, as well as concepts stemming from the human capital model itself. They can be further broken down into human capital specific variables and background. Table 1 provides a list of all the variables , definitions, and the expected effect of the variable on poverty status in 1990. A predicted (-) sign indicates that the variable should decrease the likelihood of being poor in 1990. A

TABLE 1:Independent Variables

	Definitions	exp. sign
Human Capital Variables:		
EDUCATION	Total number of years of formal education	(-)
MILITARY	Total years of military service	(-)
TRAINING	Total years of other training	(-)
Background Variables:		
HGCFATH	Total years of schooling of father	(-)
HGCMOTH	Total years of schooling of mother	(-)
FEMHEAD	1 if grew up in single-mother home	(+)
MARRIED	1 if married in 1990	(-)
TEENMOTH	1 if became mother before 18	(+)
FAMSIZE	Number in respondent's family in 90	(+)
UNEMPLOY	1 if unemployment rate > 6.0%	(+)
GENDER	1 if respondent is male	(-)
BLACK	1 if repondent is black	(+)
HISP	1 if respondent is hispanic	(+)

Table 2: Mean Values

Variable	Full Sample	Hispanics	Blacks	Whites	Males	Females
Human Capital Variables						
EDUCATION	11.63	11.37	12.01	11.38	11.53	11.74
MILITARY	0.28	0.33	0.37	0.17	0.51	0.04
TRAINING	0.82	0.95	0.82	0.76	0.83	0.82
Background Variables:						
HGCFATH	8.86	6.64	9.46	9.57	9.08	8.64
HGCMOTH	9.17	6.23	10.05	9.97	9.32	9.02
FEMHEAD	0.4	0.35	0.52	0.31	0.38	0.43
MARRIED	0.35	0.4	0.25	0.43	0.31	0.39
TEENMOTH	0.1	0.09	0.12	0.1	n/a	0.22
FAMSIZE	3.28	3.6	3.39	2.98	3.07	3.51
UNEMPLOY	2.43	2.68	2.26	2.46	2.44	2.41
GENDER	0.51	0.52	0.52		n/a	n/a
BLACK	0.4	n/a	n/a	n/a	0.4	0.39
HISP	0.22	n/a	n/a	n/a	0.22	0.22

predicted (+) sign should have the opposite effect. Table 2 lists the mean values of all the variables.

The first independent variable is total years of schooling. For ease of exposition, this variable was grouped into four broader categories. These are: 1 - 11 years of schooling, to represent the group of youths who dropped out of school; high school graduates who did not pursue post-secondary education; 13 - 15 years of schooling, to include those who attended either junior college or dropped out of a four-year school; and college graduates and above. As the level of schooling increases, the chance of staying in poverty should decrease.

Military service is the next independent variable. Similar to years of schooling, years in the military will be grouped into smaller categories. These are: zero to one year of military service, to include those who have never served and those who did not complete basic training; 2 - 3 years of service; and 4 or more years. The military provides practical training that in many cases may be transferrable to the workplace, as well as intangibles (such as leadership ability) that should decrease the probability the respondent will remain in poverty.

Following this, amount of training received is considered. This variable includes such things as apprenticeship programs, vocational training, technical schooling, and the like. Vocational training is a particularly important form of human capital investment for many individuals who choose not to attend college. Further, it provides directly applicable work skills that should also decrease the chances of being poor.

Background variables account for those situations that a youth was born into (such as family structure or race) or that describe the situation at the time of the survey in 1990 (i.e. marital status, family size). These

variables may have a direct effect on an individual's poverty status (see Haveman p. 108-31). Since many background variables, like TEENMOTH, may also influence human capital decisions, it is important to control for them in the empirical model.

The first two of these variables indicate years of schooling of the parents. The educational attainment of both the mother and the father will be broken down exactly as the earlier education variable. It is assumed that parents with higher levels of education should provide a better environment for learning and encourage their children to pursue more education. Christopher Jencks contends that, "an extra year of parental schooling yielded an extra .33 years of schooling for their children" (p. 69). The level of parental education should, therefore, have a negative effect on poverty status.

The next variable considered, FEMHEAD, accounts for those youths in the sample who grew up in a single parent home headed by the mother. It is especially important to include this variable because a high number of poor youths grew up under such circumstances. According to Ropers, "nearly half (48.5%) of the families in poverty have a female head of household" (p. 46). The possible effects of such a situation are numerous. In a single parent home, the child has less supervision and may be more likely to engage in delinquent activity. A youth may also receive less encouragement from a single parent who is working to support a family. This variable should have a positive effect on poverty. That is, a child growing up in such a home is more likely to be poor as an adult.

Following this variable is TEENMOTH, which tests the effects of those girls who became a parent before the age of eighteen. Teenage mothers have a very difficult time making the transition out of poverty (see Duncan

and Hoffman, p. 171-2; Wilson, p. 21). This may be due to the added financial burden or to the influence on human capital investment decisions, or both. In addition, the increased family size will shift the poverty line upward. Thus, the road out of poverty is even longer. This variable should have a positive sign.

The next variable is included to test the effect of marriage on a respondent's chances of leaving poverty. It uses marital status in 1990 but does not include previous marriages. Marital status is an intriguing variable in that it has dueling effects First of all, the increase in family size raises the poverty line, making the transition out of poverty more difficult. On the other hand, married individuals may benefit from their spouses income. This, of course, would decrease the chances of being poor. Also interesting is the tremendous effect marriage has on women. In fact, one study concluded that marital status is the main determinant of women's poverty status (Duncan et al., 1984). Moreover, Cohen and Tyree note that, "the increase in labor force participation of married women suggests that marital status is increasingly important for men's economic well-being, as well" (p. 804). As such studies indicate, the negative effect of marriage on poverty status seems much stronger than the effect on the poverty line. Therefore the predicted sign of this variable is negative.

The next variable considered is a proxy for the economic conditions at the time of the survey. There is evidence that a poor economy has a strong impact on the poor. Sawhill elaborates, "a decline in demand causes not only more unemployment but also a reduction in hours worked, a drop in labor force participation, and slower earnings growth, all of which affect family incomes adversely" (p. 1089). The proxy used to measure economic conditions is the unemployment rate in the respondent's local

labor market in 1990. It is figured that the higher the rate of unemployment the more likely the respondent is to be poor in 1990, thus the predicted sign is positive.

Age is another variable that is tested. It is important to include this variable in the analysis because it is an integral aspect of the human capital model discussed earlier. Also, it provides a means of factoring work experience into the equation. It is expected that age will have a negative effect on poverty, that is, it will lessen the chance of remaining in poverty. Recall the theoretical graph of an individual's human capital investment decisions. The graph of any investment sloped up to reflect the positive effect of experience on earnings. It is hypothesized that the older a person gets, the more experience and transferrable knowledge they will gain. Therefore, age should have the proposed negative effect on poverty.

The final variables account for the unfortunate social prejudices which still exist in our country. It is well-documented that women and minorities have a much more difficult time getting out of poverty than white males (see Roper, pp.46-49). Hence these last variables account for the race and gender differences in the sample. It is expected to produce a positive sign, that is, being a minority or female should increase the probability of being poor in 1990.

Before discussing the results of the human capital cross-tabulations in depth, it must be noted that two variables were tested and omitted due to data limitations. These are health of the respondent and participation in government training programs. The human capital theory holds that an individual with health limitations will have a lower earnings potential, ceteris parabis, than someone with no limitations. Thus poor health should increase the chances of being poor in 1990. The government training

variable was designed as a complement to the TRAINING variable. It was to gauge the effectiveness of participation in government sponsored programs such as Job Corps. Similar to the variable TRAINING, it was expected to have a negative effect on poverty status.

Unfortunately, the survey questions which pertained to the government training variable were only asked until the year 1987. In addition, the number of respondents receiving any government training in any given year was very small, making statistical analysis difficult. Also, when asked if they had any health limitations, there were too few positive responses. Hence, the health variable was eliminated along with the government training variable.

VI. Cross-tabulation Results

The results of the three-way cross-tabulations between poverty status in 1990, the three human capital model variables, and demographic variables appear in table 3. The significance level at the bottom of each column is for the chi-square statistic (not presented) which tests the hypothesis that there is a relationship between poverty status and human capital variables. This hypothesis was tested for each of the four ethnic groups and for men and women. The table shows that all human capital variables proved to be highly significant, with highest grade completed by the respondent and military both significant at the .05 level.

Of the human capital variables, highest grade completed by the respondent in 1990 proved to be the most significant predictor. As expected, the variable had a negative relationship with poverty status in 1990. Looking first at the male sample, Table 3a shows that, of 180 who did not complete high school, 37.2% were still poor in 1990. High school

Table 3a: Effects of educational attainment on poverty status in 1990*

Highest Grade Completed	Percent Poor in 1990				
	Hispanics	Blacks	Whites	Males	Females
0-11	48.8% (40/82)	63.9% (62/97)	37.7% (61/162)	37.2% (67/180)	59.6% (96/161)
12	23.7% (27/114)	35.5% (86/242)	20.5% (42/205)	18.1% (47/260)	35.9% (108/301)
13-15	10.8% (4/37)	12.6% (11/87)	11.1% (6/54)	6.7% (6/90)	17.0% (15/88)
16+	7.1% (1/14)	7.4% (2/27)	0.0%	6.1% (2/33)	2.5% (1/40)
significance**	.000	.000	.000	.000	.000

Table 3b: Effects of military service on poverty status in 1990

Years in Military	Percent Poor in 1990				
	Hispanics	Blacks	Whites	Males	Females
0-1	31.6% (74/234)	37.1% (159/429)	25.5% (114/447)	23.7% (122/514)	37.8% (225/596)
2-3	0.0% (0/6)	6.7% (1/15)	0.0% (0/7)	3.8% (1/20)	0.0% (0/2)
4+	13.3% (2/15)	15.0% (3/20)	0.0% (0/11)	11.6% (5/43)	0.0% (0/3)
significance	.0879	.0083	.0478	.0135	.2212

Table 3c: Effects of training on poverty status in 1990

Years of Training	Percent Poor in 1990				
	Hispanics	Blacks	Whites	Males	Females
0	26.8% (15/56)	40.6% (43/106)	27.9% (29/104)	24.0% (31/129)	40.9% (56/137)
1	25.9% (7/27)	36.0% (31/86)	22.0% (13/59)	23.4% (18/77)	34.7% (33/95)
2-3	15.4% (4/26)	17.8% (8/45)	7.7% (3/39)	9.6% (5/52)	17.2% (10/58)
4+	0.0% (0/3)	0.0% (0/3)	33.3% (1/3)	0.0% (0/5)	25.0% (1/4)
significance	.51	.0294	.0767	.0921	.0161

* numbers in parentheses indicate number in the cell who were poor divided by the totat sample in the cell

** relates to chi-square statistic

graduation sliced that number in half, with only 18.1% still in poverty. Of the 90 respondents who received some college education, only 6.7% were still poor. Only two respondents who received four or more years of higher education could not escape poverty.

The numbers posted by the females were not nearly as impressive, but were encouraging nonetheless. 59.6% of those who dropped out of high school were still poor in 1990. When compared with the male sample, the fact that 35.9% of the 301 females who graduated high school were still impoverished is fairly high. However, that number is cut drastically for those who attended college, as all but 17% were no longer poor. The females actually faired better than the men in the last category, with only 1 of 40 still in poverty.

When comparing between races, the disparity between whites and minorities is apparent. Of those who did not finish high school, 37.7% of the whites, 48.8% of the hispanics, and 63.9% of the blacks were still poor in 1990. High school graduation reduced those numbers to 20.5% of the white sample, 23.7% of the hispanic sample, and 35.5% of the black sample remaining in poverty. It is not until college that the black youths are able to make up any ground, with whites at 11.1%, hispanics at 10.8%, and blacks at a more respectable 12.6% still poor. None of the whites, 7.1% of the hispanics, and 7.4% of the blacks still lived in poverty following at least four years of college.

Enlisting in the military also seems to be a useful strategy for men. It proved to be significant at the 10% level for all the ethnic groups tested. The military was not a factor for the women in the sample because few enlisted for a year or more. Table 3b shows that those with little or no military experience had relatively high poverty rates compared to those

with 2 or more years military service. For example, 37.1% of blacks with little or no military experience were poor in 1990 compared to only 15% of blacks with 4 or more years of military experience. This is especially impressive in that most of these respondents were no longer in the military at the time of the survey in 1990.

Except for the hispanic sample, the relationship between years of training and poverty status in 1990 is negative and significant at the 10% level (table 3c). This may be due to the small number hispanics in this particular sample. When comparing blacks to whites, it is found that 40.6% of the blacks and 27.9% of the whites with less than one year of additional training remained in poverty in 1990. After one year, those numbers dropped to 36% and 22%, respectively. As the table shows, additional years of training is associated with even lower poverty rates. A similar trend is found when comparing males and females. There is a strong negative relationship between training and poverty for both. It should be noted, however, that for any given level of training, female poverty rates are much higher than those of the males.

Table 4: Bi-variant cross-tabs

Variable	chi-square	significance
TEENMOTH	38.776	.0000
FEMHEAD	8.997	.0033
MARRIED	66.239	.0000
UNEMPLOY	14.164	.0146
Family size	56.551	.0000
age	4.781	.1885
HGC mother	13.593	.0035
HGC father	2.72	.4368

The background human capital variables were cross-tabulated against poverty status in 1990 to establish bi-variant relationships. Chi-square tests showed all to be statistically significant with the exception of highest grade completed by the father and age (table 4). Of the significant variables, the teenage pregnancy, marriage, and family size variables were all significant at the .01 level. The female head of family, mother's education, and unemployment variables were also significant at the .01 level. All variables had the predicted positive or negative relationship with poverty status in 1990. They would be included as control variables in the logit analysis to follow.

VII. The Logit Model

The purpose of the descriptive analyses was to establish significant relationships between poverty status in 1990 and the independent variables. But, in order to draw any meaningful conclusions about the hypothesis, it is necessary to analyze the human capital variables while controlling for the background variables. This is done using logit analysis. The logit equation used to determine the statistical significance of all the variables is as follows:

$$\ln(P_i / 1 - P_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \text{---} + \beta_n X_n$$

P_i is the probability that individual i will be poor in 1990. X_n represents those independent variables found to be significant by the chi-square tests.

In order to accommodate the logit equation, several variables were computed differently. The variable UNEMPLOY was converted to a dummy

variable to represent "high" unemployment, with 6% being the cutoff. This represents the approximate midpoint of the total sample. Also, the variables which were compressed into smaller categories (years of training and highest grade completed, for example) were made into continuous variables. Lastly, the variables highest grade completed by the father and age were not omitted from the logit model, although they were insignificant. Their inclusion is to insure the completeness of the description of each individual's background.

VIII. Logit Results

The results of the logit testing appear in table 5. Of the human capital variables, education was by far the most significant, as hypothesized. Its level of significance was at the .001 level, as compared to the .10 significance of the years of training variable. Contrary to the findings of other research, the military variable was found to be an insignificant predictor of poverty status. This is also in contrast with the findings of the three-way cross-tabulations just presented.

Of the background variables, only three proved to be significant: MARRIED,GENDER, and family size. The variables regarding mother's education and unemployment levels were *almost* significant at .1125 and .1147, respectively. It was very interesting that many of the variables were not important in that the literature all indicated the opposite. Especially encouraging was the insignificance of the minority variables. This could be a positive sign that, perhaps, societal prejudices have somewhat subsided. It could also mean that race operates through intervening variables which are control variables in the logit equation.

Table 5: Logit Results - Full Sample

	Beta	Standard Error
Human Capital Variables:		
EDUCATION	-.4560***	.0897
MILITARY	-.1178	.1977
TRAINING	-.3212*	.1725
Background Variables:		
AGE	.1608	.2907
HGCFATH	-.0187	.0454
HGCMOTH	-.0930	.0586
FEMHEAD	.3615	.3352
MARRIED	-1.6891**	.3344
TEENMOTH	.3075	.4366
FAMSIZE	.2472***	.0836
UNEMPLOY	.4817	.3054
GENDER	-1.1113**	.3490
BLACK	.5150	.3388
HISP	-.6727	.5007

* indicates significance at the .10 level

** indicates significance at the .05 level

*** indicates significance at the .01 level

Though the minority variables were insignificant when included in the broad model, when tested alone, they did prove to be highly correlated with poverty status in 1990, both at the .01 level. Therefore, the sample of youths was once again broken down by ethnic group to examine the differing effects of the independent variables on poverty status. Because of the tremendous importance of the GENDER variable, the sample was also broken down by gender groups. The results appear in table 6.

It is through these breakdowns that the most interesting results were obtained. Of most importance is that education remained highly correlated with poverty status in 1990 for all groups but hispanics. Though the breakdowns were assumed to allow for more significant findings regarding the other human capital variables, neither MILITARY or TRAINING were significant for any group. This is opposite of the findings of the previously discussed cross-tab analysis. This may mean that youths are especially limited in their strategy options. What it definitely means is that education is vital if making the transition out of poverty is the goal.

Another interesting, and more encouraging, finding is the insignificance of most background variables. The variables pertaining to parents' education and family structure are especially encouraging. The results could indicate that children are not as susceptible to the environment in which they grew up than previous research had indicated (e.g. Jencks, p. 68; Haveman, pp. 108-131). In addition, the same can be said about the TEENMOTH variable. Maybe teenage girls with children are not necessarily condemned to poverty.

In terms of the ethnic differences, it was rather disappointing that the hispanic sample only produced two significant results, MARRIED and GENDER. Mother's educational attainment was almost significant (.1227),

Table 6: Logit Results (standard error in parentheses)

	White	Black	Hispanic	Male	Female
Human Capital Variables:					
EDUCATION	-.4604***	-.6693***	-.2432	-.3045**	-.6731***
	(.1461)	(.1787)	(.1876)	(.1231)	(.1472)
MILITARY	-3.8247	.2239	-2.7772	-.1179	'-5.5817
	(18.398)	(.2216)	(.3467)	(.2036)	(21.99)
TRAINING	-.5033*	-.4347	-.2330	-.3995	-.2984
	(.3302)	(.2925)	(.3467)	(.3017)	(.2278)
Background Variables:					
AGE	.0182	.2641	.1968	-.0632	.2768
	(.4854)	(.4849)	(.7305)	(.4689)	(.3932)
HGCFATH	-.0094	-.0301	.0568	-.0690	.0488
	(.0783)	(.0758)	(.1084)	(.669)	(.0684)
HGCMOTH	-.0947	-.0296	-.2330	-.0570	-.1384
	(.0943)	(.1042)	(.1510)	(.0860)	(.0889)
FEMHEAD	.9780	.1578	.4503	.3516	.2523
	(.6086)	(.5480)	(.8206)	(.5678)	(.4460)
MARRIED	-2.2242***	'-1.6296**	-1.7395**	-1.7167	-1.9842***
	(.5914)	(.5786)	(.7713)	(.5934)	(.4529)
TEENMOTH	.3117	.1550	.6608	N/A	.0656
	(.7861)	(.6886)	(1.174)		(.4801)
FAMSIZE	.5908***	.3024**	-.0156	-.3045**	.4478***
	(.1966)	(.1311)	(.1771)	(.1231)	(.1400)
UNEMPLOY	.7042	.8112	-.5807	.1164	.8442**
	(.4939)	(.5501)	(.7499)	(.4738)	(.4387)
GENDER	-.4274	-1.9558	-1.4862*	N/A	N/A
	(.5529)	(.6683)	(.8772)		
BLACK	N/A	N/A	N/A	-.0213	1.0321*
				(.5286)	(.48)
HISP	N/A	N/A	N/A	-1.1395	.2759
				(.8229)	(.6762)

* indicates significance at the .10 level

** indicates significance at the .05 level

*** indicates significance at the .01 level

as was the case in all the samples. This is probably again caused by the small number of hispanics included in the sample. However, many interesting findings between the black and white samples were found. For instance, marriage was slightly more important to the white sample than the black sample. This could be a statement about the high incidence of single black females raising families in the ghettos. Also of note is that GENDER was highly important to the black sample (.01 level), but not at all significant to the white sample, which does not bode well for black females.

By far, the most intriguing results appeared when comparing males to females. First, education was found to be more important for the female group than the male group. Predictably, marriage was more important to the female sample. The negative sign produced by the family size variable for the male sample is especially intriguing. It means males benefit by having a large family. More interesting is that the only time the variable UNEMPLOY was found to be significant was for the female sample. This indicates that women are much more susceptible to economic cycles than their male counterparts. Also notable is that the only time a race variable was found significant (BLACK to be precise) was for the female group. This provides even more credence to the significance of the GENDER variable in the black sample. What it says about the youths tested is that black females have the most substantial odds to overcome if they are to escape poverty.

A New Model

The logit model was able to test the relationship between poverty status and the human capital variables while controlling for background

variables. For certain, the results obtained were significant and useful. However, it is possible to take those results and convert them to a more accessible and meaningful format: probabilities. By using a spreadsheet model, the cumulative effects of the independent variables on the probability of being poor in 1990 are easily measured. To explain, each beta coefficient (as presented in tables 5 and 6) was multiplied by a base value as listed in table 7, determined primarily by the mean values of the samples. These figures are then added together and converted using the equation:

$$P_i = 1 / (1 + e^{-z})$$

where P_i is the probability of being poor in 1990, Z equals ($\beta_0 + \beta_1 X_1 + \text{---} + \beta_n X_n$), and e is measured at 2.71. The result is a percent which clearly defines the chance of being poor in 1990 given an individual with the base characteristics. Thus, the lower the number, the better.

By changing the base characteristics, it is possible to measure the effects of additional years of educational attainment[1] on individuals with differing backgrounds. This is a much more desirable and useful tool in that *specific* youths can be tested, rather than the average youth in the sample. Six such models were developed, one for the entire sample, and one for each of the ethnic and gender groups. The number of possible hypothetical youths that can be tested is endless, but for illustrative purposes, a few brief examples should suffice.

Mary is a 17 year old girl living in poverty with her mother. After 10 years of schooling, she gave birth to a baby and is raising it alone. Mary is white. If she does not return to school, her chances of being poor

[1]Similar tests could be run for the military and training variables. However, since the research hypothesis specifies education, it is the focus of testing in this model.

Table 7: Base Values Used for Simulations

Variable	Full Sample	Hispanics	Blacks	Whites	Males	Females
Human Capital Variables						
EDUCATION	11.63	11.37	12.01	11.38	11.53	11.74
MILITARY	0	0	0	0	0	0
TRAINING	0	0	0	0	0	0
Background Variables:						
HGCFATH	8.86	6.64	9.46	9.57	9.08	8.64
HGCMOTH	9.17	6.23	10.05	9.97	9.32	9.02
FEMHEAD	0	0	0	0	0	0
MARRIED	0	0	0	0	0	0
TEENMOTH	0	0	0	0	n/a	0
FAMSIZE	3.28	3.6	3.39	2.98	3.07	3.51
UNEMPLOY	0	0	0	0	0	0
GENDER	0	0	0	0	n/a	n/a
BLACK	0	n/a	n/a	n/a	0	0
HISP	0	n/a	n/a	n/a	0	0

drops to around 18%. Two years of junior college decreases that number to 5.5% and college graduation to 1.5%. For argument's sake, consider Karen. She has all the same characteristics as Mary save one: she is black. As it stands now, her probability of being poor in 1990 is 84.95%. If she returned to school, that number falls to 59.5%. Subsequent increases in education decrease her chances of being poor to 27% after two years of college and 9% upon college graduation.

Mike is a 24 year-old white male. He is married and has three children. He dropped out of school in the tenth grade after failing economics. The level of unemployment where Mike lives is fairly high. Given his present situation, the likelihood that he would be poor in 1990 is 1.24%. Had he stayed in school and graduated, his chances of still being poor would be only .50%. Two and four years of college would have made his chances of being poor .20% and .07% respectively. To convey the importance of the marriage variable, assume now that Mike is unmarried. With 10 years of education, the probability that he is poor in 1990 is about 10.5%. High school graduation reduces that chance to 4.5%. Two years of college brings the number to 1.82%, and four years to .73%.

For certain, the spreadsheet model is not one that is perfect as the infinitesimal nature of Mike's results may indicate. However, the conclusions that can be drawn from the model are dramatic. The above examples, along with those presented in table 8, clearly iterate the powerful impact on poor youths that increasing the level of educational attainment has on the likelihood of being poor as an adult, as well as the influence of gender and marriage. Taken into consideration with the results of the chi-square tests and logit model, the effect of education on poverty status is even more readily apparent. As the hypothesis

Table 8: Simulation Examples

Characteristics	Years of Schooling 10	12	14	16
Black male high unemployment 20 yrs. old 2 yrs. in military	34.10%	11.95%	3.43%	0.92%
White female married, 4 children high unemployment 23 yrs. old	55.86%	24.77%	78.90%	2.18%
Black female FEMHEAD high unemployment teen mother 2 children	84.33%	58.35%	26.71%	8.66%
Hispanic male 19 yrs. old 1 year in military	76.59%	66.80%	55.29%	43.20%
Black male FEMHEAD 22 yrs. old	39.63%	14.69%	4.32%	1.69%

predicted, additional years of education is the most important strategy for making the transition out of poverty.

VIII. Problems and Suggestions

The primary problem encountered in the course of this research is attributable to the National Longitudinal Survey of Youth. As was discussed earlier, an adequate government training variable could not be derived. Also, the questions pertaining to the other training were inconsistent and somewhat vague. Therefore, that variable is not an absolute indicator of the amount of other training attained. Rather, it is a close approximation of the desired information. Numerous pitfalls were faced pertaining to the size of the sample for several variables. This necessitated the testing of some variables differently than was hoped. For example, the variable UNEMPLOY was coded into categories in the NLSY database, which made it impossible to have the desired continuous variable.

Despite any shortcomings of the database, the results of this research should indicate that this is a topic that merits further study. To be certain, this study is a mere skeleton of the many facets which should be tested in order to derive more significant results and make more interesting conclusions. Further research should include a variable which takes into account behaviors such as drug abuse and other delinquent behaviors. Researchers such as Duncan and Hoffman have confirmed that this is a very influential aspect in the lives of poor youths (pp. 155-175). Although the NLSY does not provide for it, a study should be done which takes into account locational considerations, such as a comparison between youths living in the inner-city and rural areas. Also an adequate government

training variable must be developed in order to test the effectiveness of those programs. Ability and motivation variables would also be expecially useful to truly gauge the effectiveness of education. Finally, future testing should employ a more adequate measure of poverty. Roper cites that "many other children (15.6 million) live in conditions (25 percent above poverty line) which are virtually similar to the living conditions of the official poor" (p. 45). Thus, it should be obvious that a better measure is needed.

IV. Conclusions

The most prominent conclusion that can be drawn from this research is that children who are born into poverty may in fact have a better chance of leaving poverty than previous research had indicated. This research has shown that those things that the youths have the most control over - human capital investments - are the most important predictors of their poverty status as adults. Moreover, it has shown that of these investment decisions, formal education is of vital necessity in order to make the transition out of poverty, as the hypothesis had forecasted.

The implications of these results are quite obvious: the government must focus considerable attention on the human capital aspect of economics. The macroeconomic effects of such policy alone should be enough to assert its worth on Capitol Hill. If not, then certainly the possibility of finally making a dent one of the most embarrassing of American plagues - poverty - is enough.

To reiterate, Clinton's plan calls for more and better schooling, more on-the-job training, and greater access to college. The results of this research clearly indicate that President Clinton must make true on his

campaign promise. Poverty is a problem. Helping youths to invest in their stock of human capital could be a meaningful step in the right direction. Its now up to the politicians to determine if it is ever to be found out.

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Investments in Human Capital and the Poverty Transition

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Research Honors Proposal
Economics

INVESTMENTS IN HUMAN CAPITAL AND THE POVERTY TRANSITION

Economic theory suggests that an important strategy in moving youth out of poverty is to increase their earnings potential by investing in their human capital. Of course, such strategies can follow several alternate courses. These include pursuing higher education, vocational training, and military enlistment, to name several. This paper seeks to explore the effects of specific strategies of human capital investment on the movement of youth out of poverty using the human capital economic model to explain the effects of various economic influences. Hypotheses will be tested by employing the National Longitudal Survey of Youth (NLSY). This data base is particularly well suited to the proposed research in that it surveys a large sample of youth aged 14-17 in 1979. It then interviews them every year thereafter through 1991. Hence, it will be possible to trace each youth's investments in human capital over this time period. An empirical model will then be developed to estimate the effects of various human capital ivestment decisions on the probability of moving out of poverty when controlling for ability and a set of background variables. It is hypothesized that formal education will prove to be a powerful predictor of the poverty transition.