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Several empirical studies of the status attainment process have demonstrated that the influence of first occupation on current status decays as the time in the labor force advances. In this study we postulate three mutually exclusive models to account for this phenomenon. Using synthetic cohort data from 834 employed non-farm males, strong support was found for the proposition: the importance of the initial entry point in the labor force on current occupational status decreases as the length of time spent in the labor force increases, and the rate of this loss increases with time.

Effects of Time on the Relationship Between
Status of First Occupation and Current Occupational Status

Background

Interest in the status attainment process is of comparatively recent vintage, yet the literature in this area is voluminous. Primarily this research has focused on determining the relative effects of socio-economic background variables upon occupational status at various points in the work career. One major portion of this research has been directed toward discovering the factors responsible for early occupational attainment (e.g., Sewell, Haller, and Portes, 1969). The other thrust of the status attainment research has been toward identifying the determinants of occupational status in later periods of the career.

A large part of Blau and Duncan's (1967) seminal analysis, for example, examines the social influences on "current" occupational attainment (as of 1962). Since the respondents in Blau and Duncan's "OCG" data entered the labor force at different times, "current" occupation does not always refer to an identical career point for each respondent. In an attempt to overcome this problem, the authors create an age determined synthetic cohort, and then embark on a speculative investigation of a simple causal chain career model (Blau and Duncan, 1967: 177-188). Although this model is unrefined, it does suggest that the influence of socio-economic background factors upon occupational attainment decreases rather markedly as time in the labor force advances. Using the work of Blau and Duncan as a point of departure, Featherman (1971a, 1971b) investigated a more complex career model using true cohort data. In Featherman's (1971a:301) analysis, the decay in the effect of the background variables on current status is clearly apparent.

One of the key factors in both Blau and Duncan's, and Featherman's, models is the status of the occupation held upon initial entry in the labor force.[1] It is this first occupational status that is the basic predetermining variable at the beginning of the causal chair career models. Because of the central role played by the status of first job in these career models, it is our view that the behavior of this variable merits further study, especially in regards to the differential effect of first job at differing points in the work career.

It is our position, and that of Featherman (1971a:299), that current occupational attainment is, in part, a function of prior occupational history, and the importance of these prior statuses decays as the time elapsed increases. In symbolic terms, let $E(O_{t-1})$ be the effect of the occupation at time t-1 on occupation at time t, it is argued that

$$E(O_{t-1}) > E(O_{t-2}) > \quad . \ . \ . \quad > E(O_{t-k}),$$

where $E(O_{t-k})$ is the effect of the first occupational status. One implication of this conceptualization is that the influence of first job on curtent occupational attainment decreases, or decays, as time in the labor force increases. The longer a worker remains in the labor force, hence further away in time from the first occupation, the more work experience, and related skills, accrue to the worker. As the worker continues in the labor market, the more this acquired experience affects current attainment; concurrently, the less influential is the status of the first job.

Specifically, interest here is on changes over time in the effect of the status of first occupation on subsequent occupational attainment. We will postulate three mutually exclusive alternative formulations to account for these changes in the effect of first job, each of which implies a different dynamic career process.

The Models

The most straightforward formulation is the Constant Decay Model. This model suggests that the influence of the first occupation's status on current occupational attainment declines at a constant rate during the work lifetime. This function is graphically displayed in the first panel of Figure 1. One implication of this alternative is that if the decline in the effect of first job during the initial five years in the

Figure 1 About Here

labor force is 5%, then the decay during the last five year period is also 5%. This model may be highly unrealistic, but for the sake of conceptual parsimony, it is included here.

The requirements for this model may be formalized in terms of restrictions placed on the derivatives of the relationship between time in the labor force and the function linking first job with current status. Let $f(X)$ represent the effect of the status of first occupation upon current attainment, and T as the number of years spent active in the labor force. It is our argument that $f(X)$ is some function of T: $f(X) = g(T)$. For the Constant Decay Model, two restrictions can be imposed on $g(T)$:

$$\text{I.} \quad (df(X)/dT) < 0 \qquad (1)$$

$$\text{II.} \quad (d^2f(X)/dT^2) = 0$$

A linear function for $g(T)$ will fulfill these requirements:

$$f(X) = \lambda_0 - \lambda_1 T \qquad (2)$$

where λ_0 is the influence of first job on current occupation during the initial entry into the labor force, and λ_1 is the rate of decline in $f(X)$ as time increases.

The second alternative is the <u>Accelerating Decay Model</u>. This formulation suggests that the importance of the first job remains relatively high during the early periods in the labor market, but this effect declines rather rapidly with increased work experience. This model is especially appealing. It is reasonable to believe that after the first few years in the job market, relevant others cease to evaluate the worker's first job as it relates to future employment possibilities. Panel 2 of Figure 1 is a representation of this model. The restrictions placed on q(T) are:

$$\text{I.} \quad (df(X)/dT) < 0 \qquad (3)$$

$$\text{II.} \quad (d^2f(X)/dT^2) < 0 \ .$$

The power function would satisfy these restrictions. For example,

$$f(X) = \lambda_0 - \lambda_1 T^2 \ . \qquad (4)$$

The last model implies that the greatest decline in the effect of the first occupation on current job occurs during the early stages of the work career, while the later periods are characterized by a decreased rate of decay in the importance of the initial job. This alternative is identified as the <u>Decelerating Decay Model</u>, and it is portrayed in panel 3 of Figure 1. There is some empirical evidence to suggest that this is a realistic model: if the partial path coefficients from Featherman's (1971:301) longitudinal study of work careers are plotted against time, the resulting curve provides support for the credibility of the Decelerating Decay formulation. The restrictions on the derivatives for this model are:

$$\text{I.} \quad (df(X)/dT) < 0 \qquad (5)$$

$$\text{II.} \quad (d^2f(X)/dT^2) > 0$$

A likely candidate to meet these requirements is:

$$f(X) = \lambda_0 - \lambda_1(\log T) \ . \qquad (6)$$

While equations (2), (4), and (6), fulfill the restrictions imposed on the first and second derivatives of each conceptual model, there is a more parsimonious strategy. Let's define a very general form for g(T):

$$f(X) = \lambda_0 - \lambda_1 T^{\kappa} \qquad (7)$$

where λ_0 is the effect of the first job's status on current occupational attainment upon initial entry into the labor force, λ_1 is the slope of the decay curve, and κ is a parameter which determines the rapidity of decay. By allowing ($\kappa = 1$), the function is transformed into the Constant Decay Model. When ($\kappa > 1$), equation (7) becomes the Accelerating Decay Model. And lastly, if ($0 < \kappa < 1$), we have the Decelerating Decay Model. Thus, each of the three alternative formulations can be represented by the proper selection of a value for κ. By estimating κ, it can be determined which of these formulations is most reasonable; i.e., provides the best fit for a given set of observations. The three models, and their restrictions on g(T), are summarized in Table 1.

Table 1 About Here

One issue must be reconciled prior to embarking on an empirical evaluation of the three decay models. f(X) must be selected. Traditionally, current occupational status has been expressed as a linear combination of predetermining variables (e.g., Blau and Duncan, 1967; Featherman, 1971a, 1971b). As a first stage in the analysis, and in light of previous research, we choose to let

$$f(X) = Y = \alpha + \beta_{yx} X \qquad (8)$$

current status (Y) be a simple linear function of the status of the first job (X).

Methods

Data for the investigation comes from an area-probability sample survey of heads of households conducted in two non-urban regions of Illinois during 1971.[2] The data used in this analysis are 834 employed non-farm male heads of households under the age of 65. In the 1971 survey, data were collected pertaining to the current occupation of the respondent, time spent in the labor force, first occupation, level of educational attainment, and father's occupation. Each of the occupational variables were coded into the detailed 3-digit U.S. Census codes for occupations and industries. These codes were then translated into Duncan's (1961) socio-economic index (SEI). Although the educational attainment and father's occupation variables have not entered into the discussion so far, their importance will be demonstrated shortly. The following operational definitions were employed in the analysis.

Current Occupational Status (Y) - SEI score for the respondent's 1971 occupation.

Labor Force Time (T) - the difference between 1971 and the year of the respondent's first full-time occupation after completing his education.

Status of First Job (X) - SEI score for the respondent's first full-time occupation after completing all formal education. In the interview schedule used in the survey, there were a set of screening questions designed to insure that false starts in the labor force were eliminated from this item.

Father's Occupational Status (Z) - SEI score for the respondent's father's occupation when the respondent was 16 years old.

Educational Level (W) - the number of years of formal education attained by the respondent as of 1971.

The labor force time (T) variable was recoded into five-year intervals ranging from 0-4 to 44-49 years in the labor force, and the 834 respondents were grouped into these cohorts according to the length of time spent in the labor market. Within each cohort, the linear regression of current occupational status (Y) on status of first occupation (X) was computed. Thus, $\hat{\beta}_{yx}^{(i)}$ is understood to mean the estimated bivariate slope of this regression within the i^{th} labor force cohort. The results of these regressions are presented in Table 2. From this tabulation, an inverse, albeit non-monotonic, trend does seem to exist in the bivariate slopes.

Table 2 About Here

The last row in the table gives the coefficients for the bivariate regression after pooling all 834 observations, thus ignoring inter-cohort differences in T. The slope for this pooled regression is 0.5840, whereas the inter-cohort regression slopes range from 0.8441 to -0.2225. It is clear from these data that there is considerable variation in the effect of first job, depending on the length of time spent in the labor force.

However, as Blau and Duncan (1967:179-188) point out, data such as these are amenable to two opposing interpretations. First, the differences in slopes could be the result of workers entering the labor force during different historical periods. For example, the men in the 44-49 cohort began their work careers between 1922 and 1927, while the youngest cohort entered the labor force between 1967 and 1971. It is possible that the observed variation in slopes is due to these groups beginning their careers under varying socio-historical circumstances. The second interpretation of the slopes is as synthetic longitudinal data on a single cohort. With this interpretation, we take the labor force cohorts as a surrogate for actual longitudinal data. Unfortunately, there is no clear unambiguous way of determining which of these interpretations is correct. In the absence of true cohort data, however, we are adopting the latter interpretation, but with caution.

A second objection could be raised to the data in Table 2. Since $\hat{\beta}_{yx}$ is the ratio of the (X,Y) covariance to the variance in X, the observed decline in the $\hat{\beta}_{yx}$'s could be due to an increase in the intra-cohort variance of X. This possibility was examined closely; and while the variance of the independent variable was not strictly constant within cohorts, it did not vary to any extreme degree, nor did it vary in any systematic fashion.

Findings

Let's assume that a true trend does exist in the effect of the status of first job on current occupation (the bivariate slopes presented in Table 2), and that the anomalies in these data are the result of random error. Taking the $\hat{\beta}_{yx}^{(i)}$'s as the dependent variable, and the midpoints of the labor force time cohorts as the independent variable, a stochastic model, comparable to the conceptual model presented in equation (7), was estimated:

$$\hat{\beta}_{yx} = \lambda_0 - \lambda_1 T^{\kappa} + \varepsilon \qquad (9)$$

where ε is a random disturbance which is responsible for the irregularities in the bivariate slopes.

The estimated value of κ was obtained through an iterative procedure. First, κ was initialized at some value, say κ^*, then the error sum of squares (SSE^i) was determined for the regression of $\hat{\beta}_{yx}$ on $T^{\kappa *}$ Next, κ^* was incremented by some small value, say 0.01, then a new (SSE^{i+1}) was computed. If ($SSE^{i+1} < SSE^i$), then the cycle was repeated until a value of κ^* was found which minimized the error for the regression, and this value is taken as the estimate of the parameter. Once an estimate for κ was derived, the parameters λ_o and λ_1 were determined using ordinary least squares.

By this procedure, it was found that values of $\hat{\kappa}$ in the interval

$$4.520 \leq \hat{\kappa} \leq 4.720$$

minimized the error variance for the regression. In other words, there was no significant change in the error sum of squares for $\hat{\kappa}$ falling within the limits of the interval. The point estimate of κ was taken as the midpoint of the interval:

$$\hat{\kappa} = 4.620$$

The magnitude of $\hat{\kappa}$ suggests that the trend in the bivariate slopes corresponds much more closely to the Accelerating Decay Model than to the other two alternative formulations.

Having obtained an estimate of κ, the remaining parameters were computed, and these values derived:

$$\hat{\lambda}_o = 0.66566 \qquad (0.0781)$$

$$\hat{\lambda}_1 = -0.17455/10^7 \qquad (0.3799/10^8).$$

The standard errors of these estimates are in parentheses. The final solution to equation (9) is, then,

$$\hat{\hat{\beta}}_{yx} = 0.66566 - (.17455/10^7)T^{4.620} \qquad (10)$$

where $\hat{\beta}_{yx}$ is the bivariate slope predicted by the general decay function, equation (9). The Coefficient of Determination for this solution is 0.7251 ($F_{1,8} = 21.10$, $p = .002$). In sum, about 73% of the variance in the bivariate regression slopes can be accounted for by the length of time spent in the labor force.

By setting the right-hand side of equation (10) equal to zero, it can be determined at what point in time the status of the first job ceases to influence current status attainment. It was found that when

$T = 43.8$ years, the predicted slope was null. In short, after approximately 44 years in the labor force, the initial point of entry in the labor force is irrelevant to current status. If it is assumed that, on the average, workers enter the labor market when they are about 20 years old, then our prediction equation suggests that by age 64, first job is completely unrelated to current attainment. This is, of course, just empirical confirmation of the obvious: by the time workers are preparing to retire at the end of their active work life, the initial status is no longer an issue of practical interest. However, it is comforting to know that the empirical model, equation (10), gives predictions consistent with our knowledge of the operation of the labor market.

Rarely, however, is there interest <u>only</u> in the effect of first job on current status. More typically, socio-economic background variables are also included in the model. Two of these variables which appear frequently in the literature are the respondent's educational attainment and father's occupational status.

Within each cohort we computed $\hat{\beta}_{yx\cdot zw}$, the partial slope of the regression of current status (Y) upon first job (X) after controlling on the linear effects of father's occupational status (Z) and the respondent's educational attainment (W). These partial slopes are given in Table 2. As can be seen from this tabulation, there appears to be a general decay trend in the magnitudes of these partial slopes, but this trend is far from being monotonic. Using the partial slopes as data, the following stochastic model was fitted:

$$\hat{\beta}_{xy\cdot zw} = \lambda_o - \lambda_1 T^K + \varepsilon . \qquad (11)$$

The procedure used to derive the estimates of the parameters in (11) were comparable to those outlined previously. It was discovered that values of $\hat{\kappa}$ in the interval

$$4.000 \leq \hat{\kappa} \leq 4.100$$

would minimize the error variance in this regression. Again, the mid-point of the interval was used as the point estimate of

$$\hat{\kappa} = 4.050.$$

The ordinary least squares estimates of λ_0 and λ_1 were found to be

$$\hat{\lambda}_0 = 0.47765 \qquad (0.1209)$$

$$\hat{\lambda}_1 = -0.15150/10^6 \qquad (0.5110/10^7).$$

Again, the standard errors of these estimates are in parentheses. The final solution for the regression presented in equation (11) is

$$\hat{\hat{\beta}}_{yx\cdot zw} = 0.47765 - (0.15150/10^6)T^{4.050} \qquad (12)$$

where $\hat{\hat{\beta}}_{yx\cdot zw}$ is the predicted partial slope. This solution explains about 52% of the variance in the partial regression slopes ($F_{1,8} = 8.80$, $p = .018$). By setting the right-hand side of (12) equal to zero, it was found that when T = 40.5 years, the predicted partial slope dropped to zero. Again, assuming that, on the average, most workers enter the labor force at about age 20, the solution in (12) implies that the influence of the first job becomes nil when the workers are about 61 years old.

Using the estimated functions, equations (10) and (12), the percentage decline over time in the predicted bivariate and partial slopes was determined. Figure 2 presents a pictorial comparison of these loss curves. As can be seen in the graph, there is minimal decay in the

Figure 2 About Here

effect of the first job on current status during the earlier periods in the work career. There is less than 1% decay in the gross, bivariate influence of first job for the first 16 years, and the first job has lost only 10% of its initial effect after 26.6 years in the labor force. As for the partial slopes, there is a 1% loss in effect after 12.9 years, and a 10% decay after 22.9 years. The divergence in the two percentage loss curves in Figure 2 shows clearly the results of controlling on the linear effects of educational level and father's occupational status: $\hat{\hat{\beta}}_{yx \cdot zw}$ becomes zero about 3 years prior to when $\hat{\hat{\beta}}_{yx}$ attains this value. The difference in these two values indicates that the two background factors continue to influence occupational attainment after the first job's status ceases to demonstrate any significant effect.

In summary, although the regression of the partial slopes on T is not as strong as the regression of the $\hat{\beta}^{(i)}_{yx}$'s on T, the estimated value of κ in both functions is remarkably similar (4.050 versus 4.620). The Accelerating Decay Model would appear to fit these data rather well, regardless of whether interest is in the gross, bivariate slopes, or the partial slopes.

Conclusions

Three alternative models were presented to account for the decreased importance of the status of the first job on current occupational status over time: (1) Constant Decay Model, (2) Accelerating Decay Model, and (3) the Decelerating Decay Model. Each of these formulations is a special case of a general nonlinear function:

$$f(X) = \lambda_0 - \lambda_1 T^{\kappa}$$

where $f(X)$ is the relationship between first occupation and current job, λ_0 is the effect of first job upon initial entry in the labor market, λ_1 is the slope of the decay curve, T is the length of time spent in the labor force, and κ is a parameter which determines whether the decay curve is linear, convex, or concave.

Using occupational and background data on 834 employed non-farm male heads of households to explore these various formulations, it was found that $\hat{\kappa} > 1$ thus implying that the Accelerating Decay formulation is the most reasonable of the three alternatives.

Our analysis suggests that the influence of first occupation upon subsequent occupational status is seriously attenuated by the length of time spent in the labor force. As the time elapsed between first job and current status increases, the effect of the initial entry point in the labor market is diminished. This decay in influence increases, at an accelerating rate, as time advances. The analysis also suggests that the effect of the first job remains relatively constant during the earlier stages of the work career, and that this effect does not become entirely inconsequential until the very latter periods of the career.

In conclusion, strong support was found for the proposition that

> <u>The importance of the initial entry point in the labor force on current occupational status decreases as the length of time spent in the labor force increases, and the rate of this decay increases with time.</u>[3]

NOTES

[1] In Featherman's (1971a, 1971b) study the "first" occupation is taken as the occupation at marriage. Although Featherman's "occupation at marriage" is not identical to Blau and Duncan's "first job", they are sufficiently similar to be comparable.

[2] Details on the general background of this study can be found in Summers, et al (1969), and specific discussion of the 1971 survey is in Beck (1972).

[3] The initial entry point is understood to mean the first full-time occupation after completing all formal education.

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TABLE 1

ALTERNATIVE FORMULATIONS

Model	$d\,f(X)$	$d^2f(X)$	Function	Restrictions on κ
Constant Decay Model	< 0	0	$\lambda_0 - \lambda T^{\kappa}$	$\kappa = 1$
Accelerating Decay Model	< 0	< 0	$\lambda_0 - \lambda T^{\kappa}$	$\kappa > 1$
Decelerating Decay Model	< 0	> 0	$\lambda_0 - \lambda T^{\kappa}$	$0 < \kappa < 1$

FIGURE 1

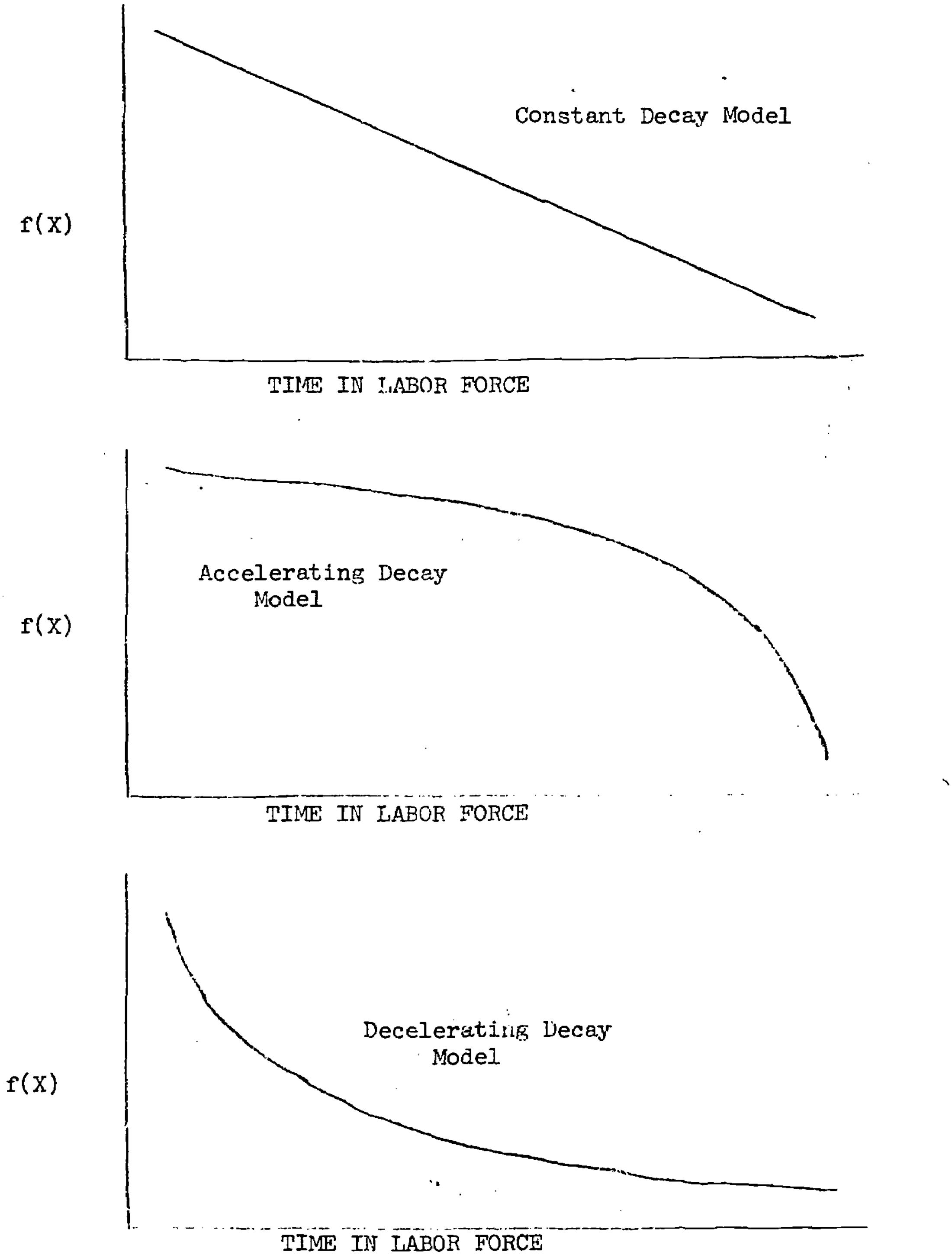
Constant Decay Model
f(X)
TIME IN LABOR FORCE
Accelerating Decay Model
f(X)
TIME IN LABOR FORCE
Decelerating Decay Model
f(X)
TIME IN LABOR FORCE

TABLE 2

REGRESSIONS OF CURRENT OCCUPATIONAL STATUS ON STATUS OF FIRST OCCUPATION

Time Category	Midpoint	Number of Observations	Bivariate Regression Intercept	Slope	R^2	Multiple Regression Intercept	Slope[1]	R^2
0 - 4	2	101	7.7195	0.8441	0.8341	2.0743	0.8044	0.8375
5 - 9	7	123	23.9372	0.6241	0.4632	14.1248	0.5916	0.4823
10 - 14	12	102	27.2311	0.4736	0.2319	-38.9435	-0.0060	0.4915
15 - 19	17	76	15.8094	0.8151	0.4852	-17.7343	0.4488	0.5491
20 - 24	22	99	26.4167	0.6342	0.4921	12.4468	0.5265	0.5275
25 - 29	27	88	27.3664	0.4455	0.1264	-10.0406	0.2684	0.3491
30 - 34	32	86	31.0682	0.3547	0.1221	12.8358	0.2324	0.2845
35 - 39	37	75	22.1232	0.7346	0.2390	-8.7530	0.5659	0.4059
40 - 44	42	63	37.3023	-0.0984	0.0058	-23.2667	-0.5117	0.4090
45 - 49	47	21	28.1786	-0.2225	0.0533	-6.9929	-0.2922	0.1829
0 - 49	--	834	23.9659	0.5840	0.3567	-2.2092	0.3653	0.4286

[1] Partial slopes after controlling on the linear effects of respondent's educational attainment and father's occupational status.

FIGURE 2

LOSS CURVES FOR PREDICTED SLOPES