Secondary Workers and the Acquisition of Negative Human Capital

Joe B. Stevens

Frequent job-changing by secondary workers in a rural labor force is found to be consistent with the human capital logic, even though negative human capital attributes are knowingly acquired in the process. The present value of future income streams from a "job-changing" strategy exceeds that from a "staying" strategy if the planning horizon for wood products work is four years or less, which is not an unrealistic length for this particular labor force.

The theory of investment in human capital has become very much a part of orthodox neoclassical thought within the past twenty years. Dating back to the seminal writing of Schultz and Becker, the published output in this area is now voluminous. As with most other broad and exciting theories, however, the passage of time and events is causing a reappraisal of the usefulness of that body of theory. Even though human capital theory has been extended to explain crime, childbearing, and marital instability as economic phenomena, it has also come under attack for failing to deliver within such conventional (and crucial) domains of interest as the personal distribution of income and earnings. For example, Blaug asserts that causal relationships, let alone functional relationships, are still far from clear despite two decades of measurement on the relationship of human capital to earnings.

The challenge to human capital theory which is of particular relevance for this paper comes from a loosely-knit group of labor economists who are associated with an evolving literature on "dual" or "segmented" labor markets (DLM or SLM, for short). Cain categorizes the dissidents as dual (especially Doeringer and Piore), radical (especially Bowles and Gintis and Wachtel), or job competition (especially Thurow). My focus here is on the dualists, although there is considerable overlap among the groups. In what follows, I attempt to (1) identify how one key dimension of the DLM argument might be reconciled with human capital theory, and (2) present empirical evidence from a rural labor force which is consistent with that reconciliation. In short, I argue that negative as well as positive human capital attributes may be acquired via the human capital logic, and that recognition of this may encourage an eventual synthesis of DLM and human capital approaches.

The Dual Labor Market (DLM) Approach

This particular challenge to orthodoxy developed during the late '60's, when there was a growing disillusionment with skill augmentation as a means of responding to concerns about a persistent degree of income inequality. In general, the critics argued that education and training programs had generally failed because neoclassical models of the

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labor market gave inadequate attention to the structure of those markets. Dual labor market theory, on the other hand, rests on three broad premises about the structure of labor markets [Wachter, p. 638]. The first is that the key distinction for economic analysis is not between skilled and unskilled *workers*, as in human capital theory, but between good and bad *jobs*. The second is that labor markets are segmented into a primary sector and a secondary sector, with minimal mobility between the two. As succinctly summarized by Zell [p. 8];

> "The primary sector is characterized by good jobs, high wages, satisfactory working conditions, employment stability, and prospects for promotion. The secondary sector, its antithesis, is characterized by bad jobs, low wages, poor working conditions, layoffs, little chance for advancement, and high turnover."

The third premise is that secondary workers develop patterns of job instability which reinforce their entrapment in the secondary sector. To again cite Zell [p. 8];

> "According to this theory, while white adult males are usually employed in the primary sector, women, teenagers and, in particular, minority groups are generally confined to the secondary sector. But because secondary firms provide little specific on-the-job training, and because a worker's current wage is unlikely to differ widely from that available in a great number of other similar jobs, a worker finds little incentive to either stay on the job or to perform particularly well at it. Hence, once a worker is in the secondary sector, the unstable work environment encourages the adoption of certain poor work habits: 'casual devotion to job, reporting for work late or not at all on some days, and quitting without good reason often within months of taking the job' [Hall, p. 683]. It is these habits which most clearly distinguish the primary and secondary sectors and which make movement into the primary sector so much more difficult. In addition, this vicious circle is reinforced as secondary-sector employers are unwilling to invest heavily in the training of a work force which is prone to high turnover, and simultaneously, are less reluctant to fire a worker in whom they have little invested. These factors thus tend to result in entrapment in the secondary sector."

The labor market as seen by the dualist, then, is one in which earnings are demand-constrained by the structure of labor markets rather than supply-constrained by insufficient investment in human capital. They see jobs within the primary sector as distributed by custom and internal ladders rather than by worker productivity, and the total number of such jobs as largely determined by technology and institutions. Within the secondary sector, they argue that human capital is in ample supply but largely irrelevant to wage determination. The most relevant form of human capital, experience gained on-the-job in the primary sector, is not available to secondary workers and cannot be purchased in schools or elsewhere. Their policy conclusion, in addition to a commitment to full employment policies and reduction of discrimination, is that primary sector characteristics should be imposed on the secondary sector through an expanded system of minimum wages, an explicit system of industrial jurisprudence (e.g., unionization), and removals of exemptions from social welfare legislation of secondary employers.

The policy focus of this group, their rejection of much neoclassical doctrine, and their failure to develop a full-fledged alternative theory have prompted survey critiques by neoclassical economists, including Wachter and Cain. Both are quite critical of the DLM approach and maintain that the neoclassical approach should be amended, not rejected. Elements of the DLM approach, however, are acknowledged as adding breadth to the neoclassical model. According to Cain [p. 1248];

> "The SLM economists' theoretical and methodological criticisms of the neoclassical theory are not substantial and are often misguided; nevertheless, a tradition of criticism of orthodox economics is sustained, and this is healthy. The main theoretical contributions, which amount to modifications and additions to orthodox theory, are (1) the ideas of the endogenous determination of attitudinal variables among workers, and (2) the historical and institutional dimensions of internal labor markets..."

That is, the general DLM characterization of secondary workers is that their entrapment (if it exists) is due not just to the inferior nature of jobs and rewards in that sector, but more basically to *adaptations* to circumstances which further impede their movement up the economic ladder. These adaptations, as noted earlier, may include casual devotion to the job, reporting for work late (or not at all), illegal activities, and frequent job-changing. In short, the DLM thesis is that worker "attitudes", "motivations", "tastes for work", call it what you will, are not simply given but are adaptations which are endogenous to the system. Moreover, the prospect is raised that these may be rational adaptations in the sense that others (primary workers, employers, etc.) might make the same decision if placed in the same circumstance. To cite Cain [p. 1223];

> "The interpretation of the SLM hypotheses about 'tastes for work' may be expressed, however, in a way that largely avoids the ideological controversies and that focuses on a major gap in neoclassical models of labor market behavior. Economists have traditionally viewed "tastes" as exogenous and as one of the (unexplored) causal variables explaining such labor market achievements as employment, earnings, and occupational achievement. The contribution of the SLM theorists lies not in reiterating the potential importance of tastes in this role, but rather in pointing out how tastes may be endogenous and a result of one's labor market achievements. Thus, the effects of discrimination, other systematic factors, or even random factors that start workers off in the secondary sector (that is, in 'bad' jobs), can shape tastes in an antiwork direction and thereby reinforce the disadvantaged position of low-wage workers. The model has an aspect of the 'vicious circle' or 'self-fulfilling prophecy' to it."

Wachter [p. 679] is also quite critical of the DLM approach, but he too notes the idea of endogenous "tastes" as a contribution of the dualists;

> "In addition, the dualists improve over most neoclassical models by introducing feedback effects into their model, although the implications of these effects are not fully integrated. The feedback hypothesis, an important concept in sociological and psychological models, views workers as altering behavior patterns (that is, undergoing shifts in tastes or preferences) in response to external stimuli. For example, secondary workers adopt unstable work patterns as a consequence of distaste for low-wage, dead-end jobs. They then become unacceptable for employment in the primary sector, and, in a meaningful sense, inferior to primary workers — contrary to the dualist unemployment hypothesis that workers in the two sectors are largely indistinguishable in their skills, human capital, and the like."

This last quotation suggests the notion that the systematic "altering of behavior patterns" by secondary workers could also be viewed as the acquisition of *negative* human capital attributes. To this point, human capital theorists have considered the acquisition of attributes which have positive payoffs; the DLM thrust now invites attention to conditions under which attributes with negative payoffs might be systematically acquired.[1] The following sections address this issue empirically in the context of a particular adaptation by production workers in Oregon's wood products industry. The adaptation, job-changing, is not only one of the more tractable behavioral outcomes (compared to "distaste for work" and "casual devotion to job"), it is also one of the more dominant modes of behavior attributed to secondary workers. In my empirical setting, two questions are asked. The first is, "Are negative human capital attributes generated by frequent job-changing?" If an affirmative

[1]This focus on negative development processes has also been taken by Padfield and Young in their research on social marginalization at the Western Rural Development Center, Oregon State University. They define social marginalization as an integral, though negative, aspect of the total economic development process whereby individuals, families, communities, classes, or cultures become isolated and enclaved relative to mainstream economic society. In their view, marginalization is not an aberration, but is rooted in rational economic decison-making. This present paper arises out of interaction with that research project and its perspective.

answer is found, the second question is, "Are these negative attributes generated as a rational response to market signals?" As it turns out, both answers are "Yes". What is presented below, then, strongly suggests that human capital theory (as well as the understanding of a particular real-world problem) can in fact be improved by applying insights from the dual labor market approach.

Problem Setting

The empirical estimates which follow evolved during the course of research undertaken to assess the current economic welfare of Oregon's wood products workers and to identify problems of future labor-release precipitated by capital substitution and by substantial declines in the availability of timber [Stevens]. Early in the research, it was established that the 75,000 jobs (i.e., average monthly employment) in the industry in 1972 were actually held by about 110,000 different individuals during the course of that year. It was further established that the 60,000 workers who had remained in the industry throughout that year (usually with a single employer) are relatively secure in terms of current income and employment levels. They average in their early forties with six to ten years of seniority with their current employer, they earn substantially more than their predicted opportunity earnings outside the industry, and their jobs are secure as long as their employer remains in business. In the event of mill closures, they will be the first hired by other mills. In the vernacular of the industry, they are the "lifers".

Another group of 25,000 workers, however, is in quite a different position.[2] These are workers who entered or left the wood products industry during 1972; many also changed employers within the industry in that year. Primarily in their twenties, their average job length is only about one year; most have held even shorter jobs than this. In industry terms, these are the "floaters" who work at less skilled jobs but nonetheless provide a labor source to meet peak demands. Their employers, who express strong hiring preferences for more stable workers, generally view the floaters (but not their work environment) in DLM terms (e.g., high turnover, casual devotion to jobs, distaste for work, etc.).

The existence of these two groups, then, tempts one to label them as primary and secondary workers. To posit a strict one-to-one relationship between an imprecise theoretical construct and the real world, however, is obviously hazardous. Cain [p. 1231] notes, for example, that the DLM literature has been rather silent on discussion of explicit criteria by which workers might be assigned to primary or secondary sectors. If there is, in fact, a general duality to occupational structure, means of assignment are certainly not yet agreed upon. One can only argue, as I do, that there is a rough correspondence between the key DLM construct and reality, that these 25,000 younger, less skilled job-changers at least have a marked resemblance to the secondary workers of DLM theory.

The key issue, on the other hand, is *not* the means of assignment or that of group membership, but whether job-changing makes sense in the situation faced by job-changers, most of whom appear to be "secondary" workers.[3] The implicit human capi-

[2]In addition, about 14,500 college students were employed on a seasonal basis during 1972, another 4,500 workers left the labor force through retirement or disability, and another 5,500 could not be accurately classified.

[3]To be researchable, of course, the domain within which it "makes sense" must be specified. One type of adaptation is a dead-end street for analysis; some workers find little satisfaction in mill jobs and will often take a lower paying job outside the industry to escape the monotony of the mill. Little can be said about the rationality of this type of decision; if it makes sense to the worker, then it must make sense. Job-changing within the industry, on the other hand, is more amenable to analysis. Discriminant analysis of intra- and inter-industry job-changers revealed that the for-

tal assumption is that job-changers generate only positive human capital; the contrary case seems not to have been considered. In the reality of the Oregon wood products industry, however, job-changing does in fact stigmatize the worker who is seen by employers as violating social norms [Young and Stevens]. If this type of adaptation does reinforce one's status as a "secondary" worker, as presumed by the DLM literature, then there must be some reason (besides masochism) which triggers this action. For those frequent job-changers who are motivated primarily by income rather than work satisfaction, it could well be that the magnitude (or the timing) of the net earnings differential from job-changing more than offsets the penalties they might incur as a result of this behavior.[4] If this is the case, negative human capital attributes are systematically generated through rational adaptations to market circumstances.

Present Value Model

The above hypothesis can be tested, at least for job-changing within wood products, by a relatively simple model for estimating the present value of future income streams for two alternative labor market strategies. The first strategy is to change jobs on a yearly basis, which is modal behavior for the group of 25,000 "secondary" workers. The second strategy is to not change jobs, or in other words, to stay with the current employer. (This is an option which was obviously not chosen by this group, at least during 1972.)

The present value (PV_c) for "job-changing" would be:

$$(1) \quad PV_c = \sum_{n=1}^{j} \frac{(1-p)^{n-1}[Y_0+(n)(\Delta Yc)]}{(1+r)^n}$$

where

Y_0 = current earnings ($)

ΔYc = earnings differential from job-changing, assuming that a job can be found ($)

p = reduction (due to frequent job-changing) in the probability of finding another job[5] ($0 \leq p \leq 1$)

n = year (1, 2, ... j)

j = end of planning horizon

r = discount rate.

The present value (PVs) for "staying" would be even simpler, since penalties for job-changing are not involved. That is,

$$(2) \quad PVs = \sum_{n=1}^{j} \frac{Y_0+(n)(\Delta Ys)}{(1+r)^n},$$

where

ΔYs = earnings differential from remaining with the current employer for another year ($).

Three parameters need to be estimated to implement the model. The first, p, should reflect the (negative) impact of the negative human capital attributes which are acquired by frequent job-changing. The second, ΔYc, is the gross earnings differential from job-changing. The third, ΔYs, is somewhat more subtle in that the shadow price of "firm-specific" experience must be estimated. These tasks are dealt with in turn.

Penalties For Job-Changing

Early in the research, informal interviews with workers and employers indicated that a great premium is placed on worker "stabili-

mer were more likely to find job satisfaction in mill work and that their decisions were far more likely to reflect monetary rather than non-monetary considerations [Stevens, pp. 140-146]. This suggests the appropriateness of a present value model for evaluating intra-industry job-changing.

[4]The DLM literature suggests that the net earnings differential from job-changing would be zero in a "pure" secondary sector; i.e., there would be no chance for advancement. Again, this is a polar theoretical construct; in reality, some gains may be obtainable.

[5]Another alternative is to include (p) in the denominator as additional discounting for risk, i.e., $(1 + r + p)^n$. This procedure yielded results which were even more favorable to job-changing than those shown here.

ty" in the hiring process, even for unskilled entry-level jobs, and that instability reduces the likelihood of getting a job. Perceptions of relevant hiring criteria for entry-level jobs (where most job-changing occurs) were elicited on an individual basis from a group of personnel managers and unemployed workers and ranked in order of importance by these individuals. Personnel managers and workers alike perceived that the hiring process favored those with stable work histories as measured by such criteria as "length of time worked for last employer", "reason for leaving last job", "whether or not fired by previous employer", and "number of employers in the past five years" [Young and Stevens].

In order to verify the accuracy of these perceptions, statistical analysis of actual hirings was also conducted by use of data from job application forms on file at four of the larger firms whose personnel managers had been interviewed. The sample consisted of 46 workers who had recently been hired for entry-level jobs and 89 applicants who had been considered but not hired. In view of the rather large number of criteria (24) which had been identified by personnel managers and workers, discriminant analysis was used to sort out those criteria which best differentiated between workers who were hired and those who were not hired.

Finally, the data set (now reduced in scope by the discriminant analysis) was subjected to logit analysis since the goal was to isolate the effect of job-changing on the probability of getting another wood products job at some later point in time. According to the best estimate (Equation I, Table 1), an additional wood products job in one's work history would reduce the probability of future (wood products) employability by about 14 percent. Extremes in job length were also important; decreases in the minimum length of job would reduce employability by 5 percent per year at the margin (or about a ½ percent reduction in employability for having held a 6 month job as contrasted to a 7 month job). Inter-industry job changers were also penalized; those applicants who were at that time in wood products had a 15 percent greater chance of being hired than those who were outside the industry.

Three conclusions emerged from this portion of the research [Young and Stevens]. One is that workers are, in fact, penalized for adopting a "job-changing" strategy. The second is that positive effects of conventional human capital attributes (education, experience, health) are conspicuously absent from Table 1, having been eliminated by the discriminant analysis. The third is that the penalties for job-changing arise less from economic reasons than from social norms which the more "stable" personnel managers apparently seek to impose on the pool of younger, less stable job applicants. While this latter conclusion can be disputed, only the *existence* of penalties is important for implementing the present value model. Accordingly, the parameter p of Equation 1, the reduction in future employability associated with a "job-changing" strategy, is taken to be 14 percent per job change, which occurs, for these workers, on an annual basis.

Earnings Differential From "Job-Changing"

The expectation of gain from intra-industry job changing (ΔYc) is essentially an empirical question. Fortunately, this information was available from interviews conducted with a state-wide random sample of 99 "primary" and 46 "secondary" workers in 1972. From work history data, mean annual earnings differentials (for voluntary job changes) of $1,755 (87 cents per hour) and $860 (45 cents per hour) were identified for primary and secondary workers, respectively.[6] Neither confidence interval contained the mean of

[6]Most job changes were made within the three years prior to 1972. Historical unemployment rates of 3 and 7 percent, respectively, were used in extending the data on hourly wage increases into annual earnings differentials for primary and secondary workers.

TABLE 1. Effects of Worker Instability on the Probability of Being Hired in Wood Products.[a]

	Logit Models[b]		Linear Models[c]	
Independent Variable	I (n=79)	II (n=53)	III (n=79)	IV (n=53)
Number of wood products jobs in the past	−.1423 (.0578)	−.1229 (.0753)	−.0637 (.0464)	
Veteran[d]	−.2864 (.1327)	−.1447 (.1466)	−.1594 (.1042)	
Length of shortest job held in the past[e]	.0543 (.0292)	.0226 (.0298)	.0500 (.0198)	.0356 (.0251)
Last job was in wood products[d]	.1518 (.1250)	.0679 (.1439)	.2788 (.1128)	.2178 (.1349)
Complete application form[d]	.1186 (.1226)	.0947 (.1347)	.2872 (.1190)	.3011 (.1419)
Adjusted R^2			.188	.095
Likelihood ratio[f]	<.01	<.15		
Constant			.0605	−.0918

[a]Standard errors are in parentheses. All 79 workers had prior work experience in wood products; equations II and IV exclude 26 observations from one firm which discriminated against veterans, apparently for idiosyncratic reasons (Stevens, 1978, pp. 94-101).

[b]Estimates show effect (on probability of being hired) of a unit change in an independent variable (X_k); that is,

$$\frac{\partial P}{\partial X_k} = \beta_k P(1 - P),$$

where β_k is the logit estimate and P is the proportion of the sample which was hired (.34 in I, .32 in II) (Hanushek and Jackson, 1977, pp. 188-189).

[c]Estimated for comparison and to derive R^2 values, even though the regression coefficients are subject to bias because of the discrete dependent variable (1 = hired, 0 = not hired). Equation IV estimated after deletion of variables which were non-significant in III.

[d]Discrete variables (1 = yes, 0 = no).

[e]In years.

[f]Tests the hypothesis that all parameters are zero; asymptotically distributed as chi-square.

the other group ($\alpha = .05$), thus tending to bolster the argument for duality of this particular labor force.

Earnings Differential From "Staying"

Whereas the earnings differential from job-changing can be quantified directly from the data, that which arises from the "staying" strategy must be estimated as the (partial) value accruing to another year's experience with that employer. To accomplish this, Ervin and Stevens and Ervin used cross-sectional income determination models to estimate the productivity of various human capital attributes, including firm-specific work experience (i.e., firm seniority) in wood products. *A priori,* this latter magnitude would exceed that derived for other forms of work experience only to the extent that firm-specific experience is necessary to perform production-line tasks in this industry. If all forms of work are completely substitutable for each other (all on-the-job experience is "general"), then the partial effects on earnings of each form of work experience should be the same.

Most cross-sectional income determination models use only a single equation and define the dependent variable as hourly, monthly, or yearly earnings [Rees and Schultz and Stoikov]. While these approaches may be useful for predictive purposes, two problems exist with respect to making structural infer-

ences about the marginal returns to specific human capital attributes. Both problems are dealt with below, although the first is resolved more satisfactorily than the second. The first is that labor earnings depend on both remuneration per unit of time *and* the number of time units that the worker is employed. Low earnings can arise from low wages, frequent unemployment, or both. Moreover, the productivity of various human capital attributes and/or the effects of institutions (e.g., the seniority system) may vary in the two cases.[7] In the regression estimates which follow (Table 2), weekly earnings (W) and the number of weeks worked in a year (Q) (and hence, total yearly earnings (I)) are hypothesized to be determined by variables which embody human capital attributes of workers (X_i) or which otherwise affect the supply of or demand for labor (Z_i).[8] That is,

$$W = f_1(X_i, Z_i) \tag{3}$$

$$Q = f_2(X_i, Z_i) \tag{4}$$

$$I = W \cdot Q \tag{5}$$

$$I = [f_1(X_i, Z_i)] \cdot [f_2(X_i, Z_i)] \tag{6}$$

If equations (3) and (4) can be estimated, it is then possible to derive "marginal earnings coefficients", $\frac{\partial I}{\partial X_i}$, which show the relationship to yearly earnings of particular human capital attributes. That is,

$$\partial I/\partial X_i = \frac{\partial f_1}{\partial X_i} \cdot Q + \frac{\partial f_2}{\partial X_i} \cdot W \text{ , or} \tag{7}$$

$$\partial I/\partial X_i = \frac{\partial W}{\partial X_i} \cdot Q + \frac{\partial Q}{\partial X_i} \cdot W \tag{8}$$

where $\frac{\partial W}{\partial X_i}$ and $\frac{\partial Q}{\partial X_i}$ are partial regression coefficients from equations (3) and (4), and Q and W are selected values for appropriate groups of workers. The first term of equation (8) reflects the expected increment due to higher weekly earnings, holding constant the number of weeks worked. The second term is the increment due to an increase in number of weeks worked, holding constant the level of weekly earnings.

The second problem with using cross-sectional wage or unemployment regressions to make structural inferences is that they are generally reduced-form equations [Blaug]. Education, for example, may cause a worker to be more valuable to a wood products employer, but it may also cause him to be less likely to supply his labor to that industry. Either a rightward demand shift or a leftward supply shift (or both) would be consistent with a positive relationship of education to wage rates. This reduced-form problem can be lessened (but not eliminated) by appropriate specification of variables and by careful definition of data sets. As to variable specification, measures of different types of work experience and other human capital variables were available from the life-time work histories of 189 workers in the state-wide random sample. In addition, a variable was included in the weekly earnings equation to reflect the predicted opportunity earnings *outside* the wood products industry.[9] The

[7]The effect on earnings of additional firm-seniority cannot be attributed solely to worker productivity if custom or union contracts mandate that more senior employes have greater protection from lay-offs.

[8]Weekly earnings would depend upon both hourly wage rates and length of the work week. In theory, choices between income and leisure may affect the latter. The assembly-line nature of production militates against such choices in this case.

[9]Weekly earnings in non-wood products jobs were regressed against age, education, vocational training, disability, total wood products experience, total non-wood products experience, experience in two specific occupations and industries and four dummy variables for specific occupations and industries [Stevens, pp. 67-70]. Squared terms were also included for age, education, total non-wood experience, and total wood products experience. Twelve (of sixteen) variables were significant at $\alpha \leq .05$, with $R^2 = .50$, $n = 264$ jobs.

appropriate interpretation of the coefficient itself will not be clear, since the variable could reflect both supply and demand considerations. That is, those with higher opportunity costs might be less likely to work in wood products (supply); they might also be more productive workers in wood products (demand). In any event, the intent in specifying this variable is to allow supply considerations to surface and to better isolate the partial effect of firm seniority.[10]

As to definition of data sets, the equations for weekly earnings (excluding fringe benefits, for which data were not obtainable) were estimated from all the wood products jobs in the lifetime work histories of the entire sample in order to allow the full range of data to be utilized (I, II, and III in Table 2). The equations for explaining weeks worked (IV and V), however, utilize only data on those workers who attempted to work full-time for a single wood products employer in 1972. That is, those with voluntary unemployment periods were excluded, as were those who also worked for another employer during that year.[11] The interpretation of coefficients, then, is that they reflect the expected outcomes for those who would *attempt* to remain with a single employer, i.e., for those who would follow a "staying" strategy.

Both the regression results (Table 2) and the marginal earnings coefficients (Table 3) reveal that earnings are indeed influenced by a variety of human capital attributes.[12] For the purpose at hand, however, we are primarily interested in the size of the marginal earnings coefficient for firm seniority, which should be an approximation to the expected differential from the "staying" strategy. As indicated in Table 3, these amounts are quite small at $170 for plywood workers, $77 for loggers, and only $11 for sawmill workers, or roughly $100 per year over the entire industry.[13] Moreover, these amounts are not always larger than the marginal earnings coefficients which are derived for other forms of work experience, within or outside the industry.[14] Only in the case of the plywood sector (with a more complex production process) is firm seniority rewarded more highly than other wood products experience. Even in this case, the differential for "firm-specific" rather than "general" experience amounts to only $65 per year (about 3 cents per hour), which is

[10]Although not shown here, deletion of predicted opportunity earnings from the equations for weekly earnings (I, II, and III in Table 2) resulted in only a very slight increase in absolute value of the other coefficients; very little change occurred in relative magnitudes.

[11]Had these workers been included, the statistical results would have a different interpretation. Workers with little firm seniority, for example, might anticipate a lay-off by taking a job with another firm. In this case, the dependent variable (weeks worked) would reflect how successfully they can execute a job-changing strategy. While this is an interesting question, the immediate focus is on implications of a "staying" strategy.

[12]*A priori* expectations included (a) positive returns to the individual types of work experience, (b) diminishing returns to age, education and total wood products work experience, and (c) substitutability between firm seniority and other wood products experience due to the simplicity of many production line jobs.

[13]Additional support for this approximate magnitude comes from a regression analysis of changes in weekly earnings by 52 voluntary job-changers within wood products (R^2 = .19). The (highly significant) partial regression coefficient for "years of wood products experience" was $2.16, which converts to $112 yearly for a fully employed worker [Stevens, pp. 146-148]. In other words, workers do become somewhat more valuable as they gain industry experience, but this increment can be captured equally well by job-changing or by staying with the current employer.

[14]If these estimates reflected only demand considerations, one would not expect that firm-specific experience would be *less* valuable at the margin than general experience. The explanation for this occurrence in logging and sawmills appears to be that supply considerations have not been entirely removed. This is consistent with observations by personnel managers that more senior workers are often content with their current jobs and do not "bid" on internal job openings (above entry level) which involve more pay and more responsibility.

TABLE 2. Regression Analyses of Weekly Earnings (Work History Data) and Weeks Worked During 1972.[a]

	Weekly Earnings			Weeks Worked	
Independent Variables	I Logging	II Sawmills	III Plywood	IV Logging	V Sawmills & Plywood
General:					
Age	10.61 (3.05)				
Age (squared)	−.119 (.004)			.010 (.005)	
Education (yrs).		20.97 (9.19)			
Education (squared)		−.72 (.36)			.008 (.005)
Vocational training[b]		−.99 (.34)			−.073 (.049)
Disability[c]		46.44 (21.73)			
Work experience (yrs.):					
Firm seniority (current employer)			5.53 (1.33)	−.87 (.41)	.054 (.030)
Other wood products firms		3.73 (1.32)	4.49 (1.52)	−.72 (.38)	
(Firm sen.)(other wood prod.)	−.40 (.16)				
All wood products (squared)	.086 (.030)		−.193 (.006)		
Non-wood products	−2.99 (2.02)	2.78 (1.21)	4.52 (1.02)	−.72 (.46)	
Opportunity earnings:[d]		.32 (.16)	.157 (.008)	[i]	[i]
Job-specific:					
Years ago[e]	−5.93 (.97)	−2.15 (.74)	−6.23 (.66)	[i]	[i]
Frequency of training[f]	28.41 (13.18)			[i]	[i]
Capital/labor ratio[g]	[i]	[i]	[i]	[i]	.062 (.032)
Union membership[h]	[i]	[i]	[i]	−3.45 (2.58)	
Plywood job	[i]	[i]	[i]	[i]	.69 (.45)
Constant	31.81	−14.68	151.59	49.51	49.37
R^2	.372	.478	.552	.194	.220
n	164	130	153	35	57

[a]Standard errors are in parenthesis. Coefficients are those computed after deletion of non-significant variables (which are left blank).

[b]Weekly earnings: months of vocational training in high school. Weeks worked: months of vocational training in high school and other types of vocational and on-the-job training.

[c]Hours and/or types of work limited (1 = yes, 0 = no).

[d]Predicted non-wood products earnings at time of wood products job.

[e]Time elapsed since end of job (means: logging = 4.3 yrs., sawmills = 4.4, plywood = 3.7).

[f]Supervision received on at least a weekly basis (1 = yes, 0 = no).

[g]Appraised value (000) of structures and equipment per worker, in thousands of dollars.

[h]1 = yes, 0 = no.

[i]Variable not included in regression.

TABLE 3. Marginal Earnings Coefficients.[a]

Human capital attributes (Xi)	Yearly increment due to higher weekly earnings[b]			Yearly increment due to less frequent unemployoment[c]			Sum		
	Logging	Sawmills	Plywood	Logging	Sawmills	Plywood	Logging	Sawmills	Plywood
General:									
Education	0	$195.62	0	0	$32.70	$32.70	0	$228.32	$32.70
Vocational training	0	−51.48	0	0	−14.36	−14.36	0	−65.84	−14.36
Work experience:									
Firm seniority	$93.60	0	$159.70	−$16.78	10.62	10.62	$76.82	10.62	170.32
Other wood products	158.60	193.96	105.62	24.89	0	0	183.49	193.96	105.62
Non-wood products	−17.68	144.56	235.04	24.89	0	0	7.21	144.56	235.04

[a]Work experience coefficients in logging reflect the combined effects of age *and* experience on the assumption that workers perceive these effects to be inseparable.

$$\left(\frac{\partial W}{\partial Age} = 137.80, \frac{\partial W}{\partial FS} = -44.20, \frac{\partial Q}{\partial Age} = 224.91, \frac{\partial Q}{\partial FS} = -241.69\right).$$

[b] $\frac{\partial W}{\partial X_i} \cdot \bar{Q}$

where $\frac{\partial W}{\partial X_i}$ are derived from Table 2 and evaluated at the means of X_i for the respective groups. $\bar{Q}$ is assumed to be 52 weeks, or full-time employment. Partial derivatives for firm seniority (FS) and other wood products (OWP) utilize the equality, $WP^2 = (FS + OWP)^2$, where WP = all wood products experience.

[c] $\frac{\partial Q}{\partial X_i} \cdot \bar{W}$

where $\frac{\partial Q}{\partial X_i}$ are derived from Table 2 and evaluated at the means of X_i for the respective groups. Average weekly earning in 1972 ($\bar{W}$): logging = $277.81; sawmills and plywood = $196.76.

not a terribly large disincentive to job-changing.

Present Value Estimates

To this point, it has been documented that secondary workers in wood products can expect increments to earnings from either "staying" ($100 per year) or "job-changing" ($860 per year), but that the latter strategy reduces one's likelihood of future employability within the industry by about 14 percent per year. This dilemma can now be quantified by solving equations (1) and (2) for the present values associated with the two strategies. First, however, several qualifying considerations should be examined. One is that the true ΔYc value may be somewhat different than that which was estimated ($860 per year). For one thing, all secondary workers probably do not have the alternative of gaining 45 cents per hour through annual job-changing, even though this mean value was recorded for actual job-changers. Accordingly, present values from "job-changing" (Table 4) are also computed for an increment one standard error smaller than the mean value (i.e., $610 per year).

Secondly, by what interest rate should the income streams be discounted? Haveman and Krutilla used a weighted rate which reflected both marginal borrowing and lending rates, by income class. My impression of this particular population is that they are basically borrowers, not lenders. Accordingly, a rate of 14.5 percent was computed to represent the (weighted) average rate paid by U.S. consumers in 1972 on various forms of installment credit.[15] As it turned out, the present value estimates were quite insensitive to the discount rate; use of an 8 percent rate changed the comparative values only very slightly.

[15]By type, the credit was for auto loans (35 percent), personal loans (30 percent), other consumer goods (30 percent), and repair and modernization loans (5 percent). By sources, the creditors were commercial banks (46 percent), finance companies (26 percent), credit unions (13 percent), retailers (13 percent), and miscellaneous (2 percent).

TABLE 4. Present Value of Future Income Streams.[a]

Strategy	Planning Horizon			
	3 years	4 years	5 years	10 years
Job-changing within wood products				
Mean earnings differential (ΔYc = $860/yr.)	$19,327	$23,560	$26,979	$36,172
Mean earnings differential, reduced by one standard error (ΔYc = $610/yr.)	$18,412	$22,275	$25,346	$33,351
Staying with current employer (ΔYs = $100/yr.)	$18,859	$23,746	$28,065	$43,188

[a]Both strategies assume initial earnings of $8,000 ($Y_0$ of text equations 1 and 2) and are incremented yearly by ΔYc or ΔYs with a discount rate (r) of .145. Job-changers are assumed to make the initial job-change in Year 1 with p = 0, which makes the numerator of text equation 1 equal to [8,000 + (1)(860)] for the mean earnings differential. In Year 2, the expected earnings differential is still $860, but there is now a 14 percent chance that they will not be able to *get* a job. Thus, the numerator for Year 2 would be (1 − .14) [8,000 + (2)(860)], or $8,359. This computation is probably conservative in that it assumes a 14 percent chance of zero earnings, or that the would-be job changer is completely unemployed during that year. A more realistic assumption would involve a job search of extended, but not infinite, length.

Finally, what is the length of the relevant planning horizon for these workers? At a 14 percent yearly reduction in re-employability, only the masochist would "job-change" if he were locked into the industry for life. In this particular case, however, these younger workers are not locked into wood products; those who leave the industry do so primarily on the basis of their feelings about work satisfaction (Table 5). Contrary to what had been anticipated, they are evidently not constrained by inadequate education, age, lack of skill and experience, or rurality. Their decisions to leave wood products have been relatively free from these constraints; hence, their planning horizons within the industry have not needed to be long. In contrast to older workers, these younger workers may well be exploring alternative occupations with a somewhat less risk-averse outlook.

TABLE 5. Discriminant Analysis: Two Groups of Workers Who Voluntarily Left Wood Products Jobs[a]

	Those taking other wood products jobs (n=52)		Those taking non-wood products jobs (n=27)
General			
Age		30.01	
Education		11.54	
Vocational training[b]		8.72	
Experience (years)			
Wood products		5.52	
Non-wood products		1.07	
Construction		.16	
Durable good mfg.		.11	
Manager or craftsman		.27	
Semi-skilled laborer	.09	(**)	.38
Job left			
Length of job		2.50	
City size[c]		7.37	
Value of experience[d]	1.02	(*)	0.74
Skilled job (D)[e]		.68	
Weekly earnings		$187.37	
Job taken			
Inter-county migration (D)		.25	
Inter-state migration (D)	.04	(***)	.30
"Knew people" as source of job information (D)[f]	.58	(***)	.15
More valuable experience than job left (D)	.13	(***)	.48
Change in weekly earnings		+$22.20	

[a]Mean values shown separately only if variable was significantly different between groups (*** = .01, ** = .05, * = .10). Variables with (D) are dummy variables (1 = affirmative, 0 = negative).

[b]Months of vocational training in high school.

[c]In thousands.

[d]"How much do you think the experience you gained on this job has helped you since then — a lot (2), a little (1), or not at all (0)?"

[e]Non-entry level job.

[f]Friend, relative, or previous employer.

Having disposed of these considerations, the present value calculations in Table 4 bear out the general rationality of frequent (internal) job-changing by secondary workers. At the estimated ΔYc and ΔYs values, job-changing "makes sense" if the planning horizon were about 4 years or less. At a somewhat more conservative ΔYc value ($610 per year), the job-changing strategy is superior for planning horizons up to about 3 years although it suffers badly in any event if the workers looks 10 years ahead. In view of the evidence in Table 5, however, "planning horizons" of this length are relevant only if workers are locked into the industry by factors other than choice, which in this case they have not been.

The only substantive reservation to these conclusions is that possibility that the propensity to change jobs may also jeopardize a worker's future ouside the industry. There is no evidence that this is the case; indeed, regressions of the length of unemployment period (following any type of employment) on various stability factors revealed nothing. It may be that non-wood products employers *expect* these workers to have unstable work histories because of the nature of the industry, which is highly sensitive to housing starts and interest rates.

Conclusions

Although neoclassical critiques of the dual labor market literature have come down rather hard on that approach, the endogenous determination of "tastes" or "attitudes" of workers appears to be a contribution which should either be assimilated into human capital theory or form an integral part of whatever evolves to replace it. The outcomes of personal investments by workers need not always be "good"; indeed, the DLM approach forces one to ask whether "bad" outcomes might be systematically expected in some situations. In the particular case which was documented here, job-changers acquired negative human capital in the form of unstable work histories, but they did so in a manner consistent with the human capital logic. It appears that these particular workers are being marginalized (in the terms of Padfield and Young) only in a partial sense; they may continue to fare reasonably well as long as they have access to jobs outside the wood products industry (which is another question in itself, due to expected declines in timber supply in this timber-dependent region). The prospect is raised, however, that less desirable outcomes may occur in other situations, and that the present directional bias of human capital theory should be abandoned in favor of a more generalized view of labor adaptations.

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