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PREFACE

No area of economic study is more urgent today than that of labor and manpower economics. In an economy as large and geographically diverse as the United States, a myriad of important problems in the utilization of human resources is constantly awaiting solution or amelioration. This volume of the Research Series illustrates the dimension of the need for answers and information by the breadth of its contents.

The study of labor market activity among nurses by Bognanno and Delaney begins the volume with an investigation of a vexing problem in modern economies: throughout the adult population there are vital manpower supplies which remain outside the labor force. Their study addresses part of this problem by examining married nurses who are inactive in the labor force, to learn the causes of their labor force participation decisions. Policy suggestions for improving labor force activity among married nurses are provided by the authors in their conclusion.

Azevedo undertakes the examination of another aspect of labor market activity. His study focuses on the job search patterns of engineers and scientists. The patterns are described, compared with job search strategies in other labor markets, and evaluated in terms of efficiency and potential for locating positions.

In a vein related to the first two studies, Anderson provides an extensive review of research in labor turnover. Efforts to measure and evaluate the phenomenon of turnover are categorized and discussed. The variables which have been incorporated in numerous empirical studies are assessed by Anderson with an eye to identifying the best predictive variables.

Recent years have seen an increased interest in raising the skill level of the blue-collar work force. The disruptive or negative impact on the current work force which is produced by occupational upgrading in a firm is the topic of the study by Elkin. He gives special attention to the reaction of the union in situations where efforts to upgrade may generate real or perceived inequities for union members. A model for measuring negative effects is then proposed.

The work by Franklin and Glover examines the problem of labor supply in the construction industry as it relates to new entrants. A comprehensive treatment of the various methods of entry for building trades positions is used as the basis for discussing the quality of training and the implications for employment opportunity. Their analysis includes both the question of labor supply flexibility and insight into minority problems.

Foster investigates another aspect of the construction industry. His study lists some of the common public notions about labor relations and employment in construction. These impressions are then held up against the growing body of literature and research information in this area of study to test their validity. Several significant myths are uncovered.

The pertinence of the subject of inflation in the American economy is uncontested. King explores the role of Phillips curve relationships for micro-labor markets in the unemployment-inflation exchange. The secondary labor force is used in an effort to learn whether or not inflation is aggravated by the dispersion pattern of unemployment across the labor force.

The final study, by Bognanno, Jeffers, and Oliven, examines the nature of the physician shortage in the United States. The various investigations of physician shortages and health care manpower problems are reviewed and analyzed in an attempt to verify the real magnitude of the shortage.

Most of the studies collected in this volume were initially presented at the Economics Section of the Iowa Academy of Science during the 1973 annual meeting. The cooperation of the Academy is gratefully acknowledged. A much larger debt of thanks is due the Center for Labor and Management, and in particular to Series Editor Professor Thomas P. Gilroy, for invaluable support and assistance in publishing this work. Also, the technical editorial aid provided by Edith Ennis of the Bureau of Business and Economic Research, The University of Iowa, is noted with warm appreciation. Finally, the contributors themselves are to be lauded, both for their work in preparing the papers for publication and, of greater importance, for the knowledge provided in the studies.

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AN ECONOMIC ANALYSIS OF THE FUTURE WORK PLANS OF INACTIVE, MARRIED PROFESSIONAL NURSES

Mario F. Bognanno
Michael J. Delaney

Introduction

Evidence abounds which shows that the demand for health services increased rapidly during the 1960s and early 1970s. This growth has strained the production capability of many parts of the health services industry. Among other things, this situation has resulted in countless assertions of continuing shortages of professional nurses.[1] Interestingly, these claims of shortages accompany significant stock-supply increases in the number of both licensed and active professional nurses.[2]

Actually, the annual number of nursing graduates has increased by 24% since the enactment of the Nurse Training Act in 1964.[3] Hospital administrators, nevertheless, report an inability to fill nearly 10% of their positions for general duty nurses.[4] Furthermore, in 1969 the Public Health Service reported that nationally an increase of more than 20% in the current number of active nurses is required to insure "safe, therapeutically effective and efficient" nursing care.[5]

Typical of federal government responses to this type of situation, numer-

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[1] U.S. Department of Health, Education, and Welfare, *Toward Quality in Nursing: Needs and Goals*, P.H.S. Publication No. 992 (Washington, D.C.: Government Printing Office, 1963); Elizabeth Bush, Sara W. Kelley, and Dr. Thomas Hale, "The Nurse Shortage—Problems and Solutions," *Rotarian*, 115 (December, 1969), 19; "The Need for Nurses," *Occupational Health Nursing*, 19 (March, 1971), 32; and Robert Flint and Karen Spensely, "Recent Issues in Nursing Manpower: A Review," *Nursing Research*, 18 (May-June, 1969), 217.

[2] Stuart Altman, *Present and Future Supply of Registered Nurses* (Washington, D.C.: U.S. Department of Health, Education, and Welfare, N.I.H., Division of Nursing, 1971), Ch. II.

[3] Charles T. Stewart and Corazon M. Siddayao, *Increasing the Supply of Medical Personnel: Needs and Alternatives* (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1973), 5.

[4] U.S. Department of Health, Education, and Welfare, P.H.S., *Health Manpower in Hospitals* (Washington, D.C.: Government Printing Office, 1970).

[5] U.S. Department of Health, Education, and Welfare, P.H.S., Division of Nursing, *Health Manpower Source Book* (Washington, D.C.: Government Printing Office, 1969) Sec. 2: Nursing Personnel.

ous programs have been enacted to bear part of the cost of expanding health personnel training facilities, and subsidize the training of health personnel.[6] Several economists have warned against the implementation of costly educational programs when such actions are based primarily on "assertions" of shortages, hospital vacancy rates (taken at face value), or "value judgments" about, for instance, the nurse-to-patient ratio.[7] Whether or not a shortage exists, the federal government has acted to increase the stock-supply of nurses. However, one may seriously question the likely pay-off from pursuing stock adjustment policies such as those suggested by the statutes identified in footnote six.

Data presented in the remainder of this paragraph suggest that the pay-off from these policies will be greatly reduced unless incentives can be found to retain nurses in active duty.[8] Nursing is a female-dominated occu-pation—98% of the nurse labor force are women—and over 70% are married. Consequently, socioeconomic considerations suggest that for nurses the re-lation of the flow of nursing services to the magnitude of the stock of nurses is less direct than can be assumed in occupations involving males. Note that at any point in time, only 65% of the nation's nurses are in the labor force. In addition, among active nurses in the labor force, 30-35% are em-ployed part time. With such a large "inactive" reserve in the stock of nurses, it would appear that a secular increase in the nurse labor force participation rate could dramatically affect the flow of nursing services. Altman,[9] Ben-

[6] The programs which are designed to augment the stock-supply of nurses, and perhaps other health occupations, are as follows: Health Professions Education Act of 1963 (P.L. 88-129); The Nurse Training Act of 1964 (P.L. 88-581); Health Profes-sions Educational Assistance Amendments (P.L. 89-290 of 1965); The Allied Health Professions Personnel Training Act (P.L. 89-751 of 1966); The Health Manpower Act of 1968 (P.L. 90-490); Comprehensive Health Manpower Training Act (P.L. 92-157 of 1971); and the Nurse Training Act (P.L. 92-158 of 1971).

[7] Altman, op. cit., 9; Donald Yett, "Causes and Consequences of Salary Differentials in Nursing," Inquiry, VII:1 (March, 1970), 78-99; and James R. Jeffers, Mario F. Bognanno, and John C. Bartlett, "On the Demand Versus Need for Medical Services and the Concept of Shortages," Journal of the American Public Health Association, 61:1 (January, 1971), 46-63.

[8] A more general analysis of public policies designed to increase the flow of nursing services/time period would involve a comparative cost-benefit study among options like the following: increasing the long-run supply of nursing services via increases in the stock of licensed nurses; increasing the supply of nursing services through improve-ments in the productivity of active needs; increasing the supply of nursing services in particular shortage "areas" (either geographic or clinical) via migrations from surplus "areas"; increasing the supply of nursing services by raising the ratio of part-time active to full-time active nurses; and increasing the supply of labor by increasing the overall nurse participation rate.

[9] Altman, op. cit., Ch. V.

ham[10], Bognanno,[11] et al. (1972a, 1972b), and Sloan and Blair[12] have systematically studied the labor force participation behavior of professional nurses. However, economists have not given specific analytical attention to labor market considerations of *inactive nurses* per se.

In the study "Correlates of Present and Expected Future Work Status of Married Women," Sobol points out that an individual's future actions correspond closely to his expressed intentions, and that using expressed plans regarding future market work is an accurate method of predicting an individual's future labor market behavior.[13] An awareness of this relation no doubt explains why Reese, et al., were motivated to collect data on future work plans of inactive nurses and to analyze descriptively the latter's reasons for being inactive.[14]

The purpose of the present study goes beyond the Reese, et al., analysis in that it presents an analysis of the factors which explain interindividual differences in future market work plans of inactive, married nurses.

The policy question is: "How can the stock of licensed, married professional nurses be better utilized through greater labor market participation among inactive nurses?" Partial answers to this question may follow from pursuit of an understanding of: the factors which operate simultaneously to explain why some inactive, married nurses *plan* to return to nursing while others do not; or whether the distribution of the categorical dependent variable, P_i i = 1,2,3—where $P_1 \equiv$ number of nurses planning to return to nursing practice, $P_2 \equiv$ number of nurses not planning to return to nursing practice, and $P_3 \equiv$ number of nurses undecided about plans to return to nursing practice—is independent of the distribution of selected independent variables, such as spouse's income or family size.

Data

Data for this study were obtained from a probability sample of nurses

10 Lee Benham, "The Labor Market for Registered Nurses," *Review of Economics and Statistics*, LIII:3 (August, 1971), 246-252.

11 Mario F. Bognanno, Jesse S. Hixson, and Mahmood A. Zaidi, "Estimating a 'Full' Labor Supply Model for Professional Nurses" (Industrial Relations Center, University of Minnesota, 1972) (mimeographed); and Mario F. Bognanno. Jesse S. Hixson, and James R. Jeffers, "The Short-Run Supply of Nurses' Time," *Journal of Human Resources* (in press, 1972b).

12 Frank A. Sloan and Roger D. Blair, "Short-Run Supply Responses of Professional Nurses: A Microanalysis" (University of Florida, 1972) (mimeographed).

13 Marian Sobol, "Correlates of Present and Expected Future Work Status of Married Women" (Ph.D. dissertation, University of Michigan, 1961).

14 Dorothy E. Reese, Stanley E. Siegel, and Arthur Testoff, "The Inactive Nurse," *American Journal of Nursing*, 64:11 (November, 1964), 124-127.

who in August-September, 1968, were residents of Iowa, 65 years old or under, and not members of a religious order. The sample was designed by the Iowa State University Statistical Laboratories, who divided the state into 16 geographic regions from which a 10% sample of licensed professional nurses was drawn to receive a mail questionnaire. The response rate was 78.8%. A more complete description of the sampling procedure, the questionnaire, and the nature of responses is available.[15]

From the set of all respondents to the questionnaire mailing, a subset of inactive, married nurses ($N = 323$) was created for this study. The inactive, married nurses in the sample were asked to respond "Yes," "No," or "Undecided" to the question: "Do you plan to return to (enter) nursing practice?" Responses to this question constitute observations on the dependent variables which are the subjects of this study. The distribution of responses to the above question is shown in Table 1.

Table 1
DISTRIBUTION OF FUTURE WORK PLANS

	Yes	No	Undecided	No Response	Total
Number	119	56	139	9	323
Percent	36.3	17.3	43.0	2.8	100

Theory, Variables, and Statistical Techniques

Theory

Neoclassical consumer theory is usually invoked in explaining an individual's or household's labor market behavior. The theory permits the derivation of partial relations between the dependent variable (i.e., the probability of market work participation or the quantity of time allocated to market work) and such independent variables as nonemployment income or the wage of the worker's spouse; further, it is also suggestive of the importance of other variables to the labor supply decision, such as own wages (whose sign is not determined a priori) and the use of sociodemographic variables which presumably affect tastes for various activities which compete for an individual's scarce time resources. Hence, a theory suggestive of how several independent variables are related to *current* market work behavior is well developed and accepted. However, a comparable theory regarding *planned* market work behavior is yet to be formally stated.

It seems plausible that the variables affecting *current* market work behavior also affect current decisions (i.e., *plans*) regarding *future* market work behavior. Such is the assumption which guided the selection of vari-

[15] Mario F. Bognanno, "An Economic Study of the Hours of Labor Offered by the Registered Nurse" (Ph.D. dissertation, The University of Iowa, 1969).

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ables used to explain differences in the future market work plans among inactive, married nurses in this study. No doubt, what is required in understanding current plans regarding future market work among inactives within a theory of consumer choice context is information about the individual's expectations regarding changes in the value of variables which at their present levels lead to the "do-not-participate" decision. At times the interpretation of results becomes somewhat ad hoc, but in general the relations are expected to parallel those found in traditional studies of market work behavior.

Variables

In an investigation of the individual's or household's labor market behavior, the ideal requirement is to obtain observations on the wage rates of both the husband and wife and on their nonemployment income, as well as on time spent at work by each. Herein, such variables are treated as significant determinants of plans regarding future market work behavior by inactive, married nurses. However, information regarding the family's nonemployment income is unavailable, as is information on the spouse's allocation of time to market work. Data are available on the husband's monthly wage income (denoted as Y). Invoking the assumption that, in general, the leisure time of the husband and that of the wife enter into the family utility function independently, and thus the cross-substitution effect of the husband's wage on the wife's allocation of time is zero, the variable Y is treated as a proxy for nonemployment income in this study.

Since inactive nurses have no wage income to report, their wage rate (W) is not directly observable. To investigate the partial relation between market work plans and W, an estimated-wage equation based on information about the active nurses in the sample was formulated. Using this equation, a predicted hourly wage rate was assigned to each inactive nurse based on her type of degree, area of residence, field of practice or specialization, position, shift, and length of service.[16]

In addition to differential magnitudes in Y and W, variations in plans regarding market work in the future reflect interhousehold differentials in a number of factors that must be included in the empirical analysis. To capture the systematic effects of these interhousehold differences on plans, a number of taste variables were considered. These variables are defined as follows:

C = 1,0, if preschool-age children are present in the household;
    0,0, if preschool-age children are not present in the household.
U = 1,0, if household is in a community of 10,000 or more;
    0,0, if household is not in a community of 10,000 or more.
A = age of the inactive, married nurse in years.

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16 See Bognanno, op. cit., 45-47.

M = months inactive.

K = family size (i.e., number of children present in the household).

$R_1 R_2$ = 1,0,0, if renting household;

0,1,0, if buying household;

0,0,0, if owning household or residing rent free.

The dependent variables for the analysis are either the binary variable

P = 1,0, if inactive, married nurse plans to return to nursing practice;

0,0, if inactive, married nurse does not plan to return to nursing practice,

or the categorical variable P_i, i = 1,2,3 where

$P_1 \equiv$ number of nurses planning to return to nursing practice;

$P_2 \equiv$ number of nurses not planning to return to nursing practice;

$P_3 \equiv$ number of nurses undecided about plans to return to nursing practice.

Statistical methods

Two types of analyses were made on the sample of inactive, married nurses. First, the assumption was made that the independent variables discussed above are *simultaneously* considered in the determination of a nurse's plans regarding the practice of nursing in the future. Using data from the respondents who answered either "Yes" or "No" to the question regarding the return to nursing practice (see Table 1, N = 175), multiple regression analysis was used to explain interindividual differences in the binary variable P. (Mulitiple linear regression is a statistical technique which simultaneously considers the effects of several independent variables on a certain outcome.) With P as a dependent variable, the regression model is called a "linear probability function" because the coefficients and values of the independent variables determine the conditional probability that an inactive, married professional nurse (with given characteristics) will plan to return to nursing practice.[17] Exclusion of 139 nurses in the sample who were undecided about plans to return to nursing may seem inefficient; however, these inactive nurses did not have their plans about future market work well formulated and thus to combine them arbitrarily with either

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[17] There are two difficulties with this approach: the assumption of homoscedastic disturbances, which is not tenable, and the fact that the linear probability function allows E(y) to fall outside the unit-interval. Neither of these problems, however, appears to effect seriously the results of this study. The empirical results reveal the unit-interval criterion to be satisfied in general for this sample. Further, while the estimates of standard errors are probably biased, the estimated standard errors decrease rapidly with the number of observations. (See E. Malinvaud, *Statistical Methods in Econometrics* [Amsterdam: North-Holland Pub. Co., 1966], 254-58.) With a sample of 175 observations, ignoring the heteroscedacity problem is probably justified. In this study, hypothesis tests are likely to be conservative.

those who did plan to return to nursing or those who did not plan to return to nursing practice seemed unacceptable.

The second part of the statistical analysis used data on all of the responding observations (N = 314), including those who were undecided about returning to nursing. Here chi-square tests of association were performed on the sample to determine whether there is any dependency relationship between the dependent variable, P_i, i = 1,2,3, and each of the independent variables.

Empirical Findings

Regression results

Using the subsample of inactive, married nurses having definite (i.e., yes-no) work plans, preliminary analysis exhibited a relatively high correlation among the independent variables, A, M, and C. Table 2 presents a matrix of the simple correlation coefficients among A, M, and C.

Table 2

CORRELATION COEFFICIENTS AMONG A, M, AND C

Variable	A	M	C
A	1.00		
M	.5865	1.00	
C	−.6867	−.3408	1.00

The high correlation between A and M as well as between A and C makes it difficult to disentangle the separate influences of A, M, and C on P and to obtain a reasonable estimate of the magnitude of their relative effects.[18] To break the multicollinearity deadlock in the data, the age variable was excluded from the regression analysis. Further, since the variables W and U consistently failed the t-test for statistical significance at the 20% level, they were excluded from the final regression, which is shown in Table 3.[19]

With the exception of K, each variable in the reported regression had a statistically significant effect on whether or not an inactive, married nurse planned to return to nursing practice, P. It is interesting to note that the five independent variables in Table 3 account for 40% of the variance in plans. Such a result is quite satisfying since the magnitude of the R^2 sta-

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[18] J. Johnston, *Econometric Methods* (New York: McGraw-Hill Book Company, 1963), 201.

[19] The sign of the regression coefficient on W was consistently negative, and that on U positive.

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tistic is usually smaller for studies using cross-sectional household data, where the behavior of individuals is not highly deterministic in the realm of variables usually available. Even though the R^2 is relatively large, the relevant question here is not its level, but whether there is statistical significance in the underlying systematic relationship represented by the variables in the regression model. In this regard, the percent of variance explained by the model is significant (F value = 18.61) beyond the .001 level.

The parameter estimate for Y is -.0002. This result is reasonable in a theory of consumer choice context where increases in nonemployment income are expected to result in an increased consumption of leisure and other normal goods at the expense of time spent in market work. Here, presumably, increase in the spouse's income decreases the probability that an inactive, married nurse will plan to return to nursing practice. The estimated

Table 3

REGRESSION RESULTS: THE PROBABILITY OF PLANNING TO RETURN
TO NURSING PRACTICE BY INACTIVE, MARRIED NURSES

Variables	Statistics Regression Coefficient	Standard Errors	Elasticity (at means)	Variable Mean	Variable 6
Constant	.5570	—			
Y ($/month)	−.0002	.00005	−.2633	895.40	615.73
M (in months)	−.0012	.00031	−.1555	88.15	99.93
C (dummy)	.3265	.07199		.68	.47
K (number)	.0071°	.0157		2.61	2.03
R_1 (dummy)	.1402	.0888		.18	.38
R_2 (dummy)	.2280	.0721		.54	.50

° Not statistically significant at the .05 level (2-tailed test).

$R^2 = .40$;	N = 175;	$\overline{P} = .68$.
DF = 168;	F = 18.61;	6 $\overline{p} = .47$.

elasticity coefficient suggests that a 10% increase in the spouse's income will reduce the probability of planning to return to nursing by about 2.6 percentage points, ceteris paribus.

The sign of the parameter estimate for M is plausible. Holding "life-cycle" variables like C and K constant, one would expect the probability of planning to return to market work to vary inversely with the length of the inactivity period. However, given this inverse relation it is interesting to observe that the probability of planning to return to nursing is very inelastic with respect to M. The estimated elasticity coefficient is -.1555.

The sign of the parameters for C and K do not follow the pattern typically found in labor supply studies of married women. In such instances, variables like these are inversely related to the quantity of labor offered to market work. At least one explanation (ad hoc), however, for the observed

relation between P and C is defensible. Implicit to the understanding of this explanation is acceptance of the assumption that having preschool children in the home, C, is highly (negatively) correlated with age, A, and thus to the nurse's stage in the life cycle. The explanation is as follows: the inactive, married nurse with a preschool child is a relatively young woman; thus, anticipating her next stage in the life cycle (when her child is older, attending school, and prepared to care for himself), her current plans call for a return to nursing as future demand for her time in the home diminishes, ceteris paribus. Recalling that A is highly (negatively) correlated with C and that A is not controlled by the analysis, this explanation suggests that young, inactive nurses (i.e., those with preschool children) are more likely to plan to return to active duty than older, inactive nurses (i.e., those without preschool children), holding M constant. Table 4 presents data supporting this line of reasoning. Note that the percent of inactive, married nurses with preschool children varies inversely with age, and directly with the percent of nurses planning to return to nursing practice.

Table 4

AGE DISTRIBUTION OF INACTIVE, MARRIED NURSES, PERCENT WITH A PRESCHOOL CHILD, AND PERCENT PLANNING TO RETURN TO NURSING

Age	N	Percent C	Percent P
Under 30	50	100	88.00
30-35	38	97.37	86.84
36-45	47	55.52	63.83
Over 45	40	15.00	30.00

Estimates of the coefficients for R_1 and R_2 are relatively small in magnitude, implying that if an inactive, married nurse's family is either renting or buying its place of dwelling, then P is expected to be 1.4 or 2.3 percentage points, respectively, higher than for a nurse whose family owns its house. Assigning a purely "tastes" interpretation, R_i, i = 1,2, homeownership as compared to non-homeownership may be treated as a revealed preference for housework over market work. Thus, the ordered magnitudes of the coefficients R_1 and R_2 vis a vis homeownership (R_3) suggest that this variable does tend to isolate inactive nurses by tastes in the expected manner.

Chi-square results

Some 139 inactive, married nurses in the sample were undecided about their plans to return to nursing practice. Adding these nurses to those having formulated definite plans, chi-square tests of association were made. The results are shown in Table 5. In these tests the null hypothesis is that

the proportion of people in P_i, i = 1,2,3, is independent of the spouse's income, Y (which was converted from a numerical variable to a categorical variable).

Casual inspection of the raw data in Table 5 suggests a plausible relationship between P_i, i = 1,2,3, and each of the independent variables listed. Chi-square tests revealed that the relationships observed in the sample data are not likely to be caused by random variation. Thus, the null hypothesis regarding independence between P_i, i = 1,2,3, and each independent variable reported was rejected. The reader may be interested in knowing that the calculated chi-square statistics for the variables W and U failed to attain significance at the .05 level. Hence, paralleling the regression results,

Table 5

CHI-SQUARE RELATIONS BETWEEN FUTURE WORK PLANS AND SPECIFIC ECONOMIC-DEMOGRAPHIC VARIABLES

Economic-Demographic Variables	Do you plan to Return to (Enter) Nursing Practice?		
	1. Yes	2. Undecided	3. No
Spouse's income (Y)[a]			
$\leq$ \$550	35	33	18
551-850	50	39	9
851-1,150	20	39	13
> 1,151	12	28	16
Children under six (c)[b]			
No	20	49	36
Yes	99	90	20
Number of children (k)[c]			
0	3	5	22
1	28	27	8
2	27	32	5
3	22	32	8
$\geq$ 4	39	43	13
Nurse's age (A)[d]			
$\leq$ 29	44	20	6
30-35	33	38	5
36-45	30	53	17
$\geq$ 46	12	28	28
Months inactive (M)[e]			
$\leq$ 14	35	26	10
15-70	46	29	9
71-148	28	44	10
> 149	10	40	27
Home ownership status (R)[f]			
Renting	23	17	8
Buying	77	87	18
Owning	17	35	30

a. $x^2 = 20.86$, p < .005;   c. $x^2 = 72.08$, p < .001;   e. $x^2 = 44.28$, p < .001;
b. $x^2 = 38.94$, p < .001;   d. $x^2 = 57.03$, p < .001;   f. $x^2 = 32.55$, p < .001.

one cannot be sure whether or not plans regarding market work in the future are related to W and U.

A final observation is that the frequency distributions of the "Yes" and "Undecided" responses for each independent categorical variable—Y, C, and R—with the exception of A and M, follow similar patterns vis a vis the distribution of "No" responses. Therefore, for example, by moving from households where C = 0 to households where C = 1, not only does one observe an increase in the proportion of respondents planning to return to nursing but also an increase in the proportion of those who are undecided.

Policy Implications

The results of this study reveal the relationship and effects of various factors operating on the inactive, married professional nurse's plans regarding her return to nursing practice, and the probability that she will return to active duty, given that her plans are realized. As such, several important policy considerations relevant to programs designed to "reactivate" inactive nurses in relatively greater number are suggested by the results of the study.

The first of the policy considerations is born in the fact that plans are closely linked to the life cycle. Both the chi-square and regression results suggest the importance of life cycle variables such as C, K, and A to the planning process regarding future market work. Since young, inactive, married nurses exhibit the greatest tendency to plan to return to nursing, efficiency considerations suggest the modeling of *recruitment* programs directed primarily at this population of inactive nurses.

Even though the young, inactive, married nurse exhibits the greatest desire to return to nursing, ceteris paribus, many such nurses with young children are undecided about working in the future. This indecision is evidence of a need for designed programs which would enable nurses planning to return to work to realize their plans; however, these programs ought to be sensitive to the fact that a large proportion of young, inactive nurses, particularly those with a preschool child, are undecided about future work plans. Widely publicized *day-care centers* in hospitals will increase the probability that those planning to return to nursing will realize their plans, and may also be effective in shifting many nurses from the "Undecided" category to the "Yes" category with respect to future work plans. Similar effects would be expected from personnel practices which allow married nurses to work part time or on a more flexible hours basis.

The importance of encouraging and enabling young, inactive nurses to return to nursing cannot be overemphasized. In addition to the foregoing policy implications, the results of this study indicate that as inactive, married nurses grow older, and thus remain inactive for longer periods of time, the proportion planning to return to nursing diminishes and the proportion who are either undecided or not planning to return increases. If the nurses

who are undecided about returning to active duty are reflecting a reluctance to return because of a felt deterioration in professional skills, then the introduction of *refresher courses* seems to be an appropriate policy recommendation. However, focusing exclusively on those with definite future work plans (i.e., the subsample of "Yes-No" responses), if the introduction of refresher courses had the effect of reducing the negative effect of M on P by, say 25%, then P would increase by only 3.9%.

SCIENTIFIC MANPOWER AND THE PROCESS OF EMPLOYMENT SEARCH

Ross E. Azevedo

Introduction

The function or role of the labor market has been a subject of concern for labor economists for many years. The groundbreaking work of Professor Reynolds[1] in the postwar era first focused attention on the process by which individual workers moved from one employment position to another. The rise of the "manpower revolution" in the middle and late 1960s rekindled economists' interest in the structure of labor markets, but by then the problems had changed somewhat from those which existed immediately following World War II, for over time the structure of the American economy had changed drastically. In the simplest of terms, our economy had moved from a blue-collar orientation, with primary focus on the production process, to a white-collar system, with attention being paid to more highly skilled occupations which involve considerable amounts of training and possibly even a college education. In sum, the economy had developed a work force of which an ever greater proportion had gained higher and higher levels of skills.

As education became the watchword of our society, we trained more and more people, each possessing a specific mix of talents. As we invested time, energy, and money on the training of people, we found that we had created a unique set of resources. Over time, concern—the economist's concern over the allocation of scarce commodities—grew as to how well we were utilizing these resources. Perhaps few were considered as frequently as scientists and engineers, for the supply of individuals trained with such a high degree of specialization is, obviously, limited at any time.

Because the supply of engineers and scientists is limited in the short run, individuals in these professions must be utilized in the best possible way. They should be employed in those positions which will maximize their out-

[1] Lloyd G. Reynolds, "The Supply of Labor to the Firms," *Quarterly Journal of Economics*, 60 (May, 1946), 390-411; and *The Structure of Labor Markets* (New York: Harper and Row, 1951) 225-229.

put as well as provide them with the variety of intellectual challenges necessary to optimize their professional experience. In other words, the scientist or engineer—like any human resource—must be able to seek out and find the best in terms of employment. This employment search process is the focus of this paper.

A General Theory of Job Search

In the general case, the individual seeking a position wishes to move from his present job (or state of unemployment) to a different position. There are, in the economy at any time, a certain number of positions for which this individual is qualified. This can be called M,[2] where M>0. M can be defined functionally as

$$M = m(1/u, G),$$

where u is the rate of unemployment and G is the expected rate of expansion of the economy. Thus, the number of available positions is an inverse function of the unemployment rate—higher if the unemployment rate is low and lower if it is high—and would move directly in response to anticipated economic growth or stagnation of the economy. In other words, if expansion of the economy is anticipated, employers will begin expanding their employment; they will cut back on the number of employees if the economy appears to be slowing down or remaining relatively stable.[3] This system behaves similarly to that of the acceleration principle with respect to investment.

At the same time, the individual has at his disposal n strategies or methods of job search, S_i where $n \geq 1$. The individual will devote some proportion, $\emptyset_i$, of his total time, effort, and money to each employment search strategy, S_i, where $0 \leq \emptyset_i \leq 1$, and

$$\sum_{i=1}^{n} S_i \emptyset_i$$

represents his total search effort (i.e., = 1). Before discussing how an individual allocates his effort among the different methods of job search, it is worthwhile to consider a separate factor, cost.

The employment candidate will find that each possible strategy will have certain costs associated with it. These costs may be broken down into two components—direct and indirect. Direct costs are those which are function-

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[2] In actuality, the individual is unlikely ever to become aware of all M positions available in the economy because of limitations on the amount of information available. However, the fact that the information he receives concerning job openings is proportional to M means the analysis is unaltered.

[3] In the case of scientists and engineers, this is also likely to be a function of federal government expansion or reduction of the issuing of contracts. A recent example is the refusal of Congress to supply additional funds for the supersonic transport (SST).

ally related to the specific technique. These would include, for example, the expense of making trips to individual plants, the cost of attending professional meetings where "organized" job markets[4] exist, or possibly the fees charged when contracting with one or more employment agencies. Indirect costs are those associated with the waiting period between jobs and include the basic costs of family maintenance (or self-maintenance if the job candidate is single) and any other fixed obligations which the individual must meet. While direct costs are a function of the technique utilized, indirect costs would be the same for all techniques and dependent only upon the duration of unemployment.[5]

The cost relationships described above can be defined more precisely for our purposes. The basic direct cost of any search strategy, S_i, can be defined as C_i. The total direct cost will vary, however, depending upon how intensively the individual uses the technique,[6] or $\emptyset_i$. Upon combining the direct costs of search with the indirect (or waiting) costs, denoted W, we get a total cost function, C_i°, for each job search technique where

$$C_i^\circ = C_i \emptyset_i + W/n.$$

This function, assuming that the total indirect or waiting cost, W, is allocated equally among the n search strategies, represents the cost attached to any individual search strategy. The total cost function, C, for all job searches is

$$C = \sum_{i=1}^{n} C_i^* = \sum_{i=1}^{n} C_i \emptyset_i + W.$$

Given that the individual has S search techniques open to him, each having some cost, C_i, associated with it, the question becomes how the individual will allocate his total effort among them. Let us now turn to that question.

If information transmission were perfect, the rational individual would be expected to allocate his time among the individual search techniques in such a manner as to maximize his net gain. That is, he would exert his greatest effort following that strategy (or strategies) which promised the greatest likelihood of yielding employment and devote little or none of his resources to those strategies with a small possibility of any net gain.[7]

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[4] Some would argue that the degree of "organization" at such meetings leaves a great deal to be desired. Nevertheless, some form of market often exists in such circumstances.

[5] Indirect costs would be very low (possibly zero) for those individuals who are seeking employment while currently employed. Additionally, the receipt of unemployment compensation would relieve some of the burden of these costs for those eligible.

[6] Consider the cost of various numbers of trips to an employment agency.

[7] The principle can be thought of in terms of game theory where the individual uses a mixed strategy, based upon his expectations concerning job search strategies, to find a specific position which aligns with his expectations. The analysis presented in the next several paragraphs follows in that vein.

To formalize the analysis, consider any search technique, S_i. Each such technique will have a probability, Ps_i, of yielding an employment position. Each will have a probability, Pf_i, associated with it of failing to produce employment, where $Ps_i + Pf_i = 1$. For each strategy, there will be an expected gross return of $Ps_i \cdot J + Pf_i \cdot U$, where J represents the situation in which the individual obtains a position along with the economic and noneconomic benefits associated with it, and U represents the case of failing to find employment and remaining unemployed.

There will be an expected net return, $E(R_i)$, associated with each technique, where

$$E(R_i) = Ps_i \cdot J + Pf_i\, U - C_i\, \emptyset_i + W/n,$$

which is the expected gross return from any technique minus the costs associated with it. Since in real terms, the failure to find an employment position does not represent a "return," this reduces to

$$E(R_i) = Ps_i \cdot J - C_i\, \emptyset_i + W/n.$$

This relationship allows the consideration of a number of alternative search strategies or techniques:

$$S_1: E(R_1) = Ps_1 \cdot J - C_1\, \emptyset_1 + W/n$$
$$S_2: E(R_2) = Ps_2 \cdot J - C_2\, \emptyset_2 + W/n$$
$$S_3: E(R_3) = Ps_3 \cdot J - C_3\, \emptyset_3 + W/n$$
$$S_n: E(R_n) = Ps_n \cdot J - C_n\, \emptyset_n + W/n$$

These possible alternatives represent options to the individual as he seeks to find new or different employment. The vector

$$E(R_1)$$
$$E(R_2)$$
$$E(R_3)$$
$$E(R_n)$$

represents the payoff matrix to the individual as he seeks to change jobs. The rational individual with perfect knowledge will select from among the strategies so as to maximize expected return over time. However, many factors, including the lack of complete rationality on the part of all participants in the market, basic imperfections which exist in the transmission of information, and the state of the labor market, combine to make the job search process less efficient than is true in the ideal case.

An Empirical Investigation of the Models

The given theoretical framework on the process of job search was investigated by a mail survey of some 5,000 scientists and engineers who graduated from colleges and universities in the northeastern United States. The respondents were asked to report on the details of their most recent job change, regardless of when it had occurred. The questionnaires which were

returned from the foundation for the analysis which follows.[8]

The questionnaires asked that the respondents indicate, with respect to the last time they changed jobs, the relative amount of effort they extended for each of a variety of possible search strategies. The search techniques included advertisements in newspapers, professional journals, and trade papers, employment services of several types, college alumni placement offices, resume services, direct application, and friends and relatives. At the same time, they were asked to indicate the specific search strategy which actually yielded employment. The comparison between the intensity with which individual strategies were used and the extent to which they paid off provides a measure of the efficiency of the labor market behavior of the group of individuals.

Table 1 presents two types of information for the entire sample of scientists and engineers—the average intensity of utilization of a set of employ-

Table 1

AVERAGE INTENSITY OF UTILIZATION AND PERCENTAGE RETURN
OR PAYOFF OF FOURTEEN JOB SEARCH STRATEGIES:
TOTAL SAMPLE OF EXPERIENCED SCIENTISTS AND ENGINEERS

Search Strategy	Average Intensity of Utilization	Payoff to Individual Strategy
Newspaper advertisements	1.96	9.2
Advertisement in professional journals	1.67	3.9
College alumni placement office	1.35	2.8
Professional placement center of state employment service	1.35	1.5
Out-placement service provided by previous employer	1.10	0.6
The "Greensheet" or other employment newsletter	1.09	0.4
Trade papers or magazines	1.46	1.5
Professional meetings	1.29	1.1
Private employment agencies	1.70	7.4
Executive recruitment services	1.37	3.3
GRAD computerized resume placement service	1.08	0.2
Technical services agencies (i.e., employment "job shops")	1.13	0.2
Friends and relatives	2.00	30.6
Direct application	2.61	36.3

Source: Azevedo, 165, 173.

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[8] For a detailed analysis of the sampling procedure used, see Ross E. Azevedo, "The Labor Market for Scientific Personnel: The Problem of Allocation and Efficiency" (Ph.D. dissertation, Cornell University, Ithaca, New York, 1972), Ch. IV.

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ment search strategies and the relative payoff of these search techniques. Perusal of the left column of Table 1 reveals that there is considerable variability in the utilization of search strategies. The four methods receiving the least utilization include out-placement service of previous employers, employment newsletters, the computerized resume service, and technical service agencies (also known as job shops).

The explanations behind this lack of utilization are doubtless varied. Obviously, the use of an out-placement service would depend upon the existence of such a service operated by the previous employer. Such an operation would be expected only in a limited number of cases. The fact that employment newsletters and the computerized resume service received little utilization can be traced in part to their "newness." The resume service is a very recent innovation in the labor market, and while employment newsletters have existed for some time, the frequency with which they have been used has not expanded significantly.

The rise of employment "job shops" is another rather recent phenomenon characterizing the labor market for scientists and engineers. These organizations employ scientists and engineers and then contract them out to firms who need certain types of skills for some specific period of time. Individuals working in this situation are, in a sense, employed by two different employers. Their employment relationship is quite different from the type experienced by the majority of individuals. The atypical circumstances surrounding this type of employment are likely to be negative inducements to the use of this source of employment.

Four of the 14 listed employment search strategies—the college alumni office, the professional placement center of the state employment service, professional meetings, and the executive recruitment services—averaged slightly better than those previously mentioned and had approximately equal intensities of utilization. These four strategies represent somewhat different processes. Because of the distance involved, a person seeking a new job through a college alumni office usually makes contact by mail, requesting information concerning applicable employment opportunities. The possibilities suggested by the alumni office are then sorted and ranked by the job candidate, whereupon those appearing most desirable are contacted for possible employment. This process, while offering the job searcher the entire range of employment possibilities of which the alumni office is aware, is limited by the time necessary to complete the initial contact and the fact that employment possibilities may be too far removed geographically to make further investigation of certain positions possible without difficulty.

The professional placement center of the state employment service, while capable of providing ready access to some number of jobs at almost any

time, suffers from the general reputation of all employment services. The claim that the service handles only the lower quality employers, positions, and employment candidates carries over to all phases of its operations and obviously includes those efforts relative to professional placement.

The use of professional meetings as a source of employment information has certain deficiencies which all hinge to some extent on the factor of time. Such meetings are normally held on an annual or semiannual basis. To be effective, the decision to change employment—or the forced termination of employment—must coincide fairly closely with the time horizon of the meeting. The greater the time span between these two events, the less likely is this medium to be used as an employment source.

Executive recruitment services provide another relatively lightly used avenue by which to seek employment. This method has one limitation which is based upon the nature of its operation. Because these agencies are established with the primary objective of recruiting executives, the type of position they offer is more likely to have more management than scientific orientation. This situation would imply that use of such services would be limited to those trying to move from a scientific position to a less scientific one. At any time, these individuals are likely to make up only a small portion of the total population of scientists and engineers.

Higher ranking search strategies include trade papers, advertisements in professional journals, and private employment agencies. The first two of these three methods of job search are similar in nature. They represent a part of the basic communication process that exists in scientific fields of endeavor. That is, such journals and papers are used to transmit the intellectual and technical developments which are taking place at an ever-more-rapid pace. As the scientist or engineer uses such publications as ready sources of information related to his field of specialization, so too is he able to make use of them as a source of employment information. It might be noted that the procuring of such information is "easy" in that it is available for no extra effort because it accompanies the technical information.

The use of private employment agencies is a search strategy which is somewhat different from those with similar intensity of utilization. It represents a process which requires a level of actual effort which is somewhat higher than is true in the other cases. The individual seeking employment must make initial application to the agency and then follow this up by contacting those employers who have positions which are suitable to his training and skills. The desired objective of this process—employment—comes about at the completion of this latter stage.

The search strategies used most intensively were newspaper advertisements, friends and relatives, and direct application. These sources, when taken together, have at least one aspect which differentiates them from

other search techniques—the fact that contact via these strategies can be made more frequently and more easily than is the case for other search techniques.

Newspapers obviously represent a daily contact with the available labor market. Whether employed or not, the individual desiring or considering an employment change has ready access to this segment of the news media to assist in his investigation. Perusal of the want ad section will provide a considerable amount of information about the general demand for any particular type of scientist or engineer, as well as providing specific employment possibilities if they exist.

Friends and relatives provide another rather continuous form of access to the labor market. Little effort need be extended in contacting close associates for the purpose of ascertaining employment possibilities. Again, whether or not the individual applicant in question is employed at the time of the inquiry is of little importance. The ability to test the market in a rather casual manner is readily available in everyday conversation. This ease of accessibility makes the use of friends and relatives a prime search technique.

The category "direct application" is the most intensively used search strategy. It encompasses a complete array of response patterns relative to job search.

It is important to note that the nature of these search strategies, in all cases save those instances where the company or employer actually initiated contact, involves the making of some form of relatively direct application in the search for employment. For example, even after contacting present or former colleagues, some form of direct contact must be made as the individual follows up on the employment possibilities which have been suggested.

Given the range of possible search strategies, the crucial question becomes: How effective are they in actually finding employment? This question is answered in the right hand column of Table 1. This column represents a payoff matrix or vector which reports that proportion of employment positions found as a result of or via each particular search strategy. The first conclusion to be drawn from the payoff matrix is that extremely wide differences exist in the effectiveness of individual search strategies.

Four search strategies—out-placement service of former employers, the employment newsletter, the computerized resume service, and the employment job shops—when taken together account for less than 1.5% of all jobs found. Slightly better results were obtained through use of professional meetings, the professional placement center of the state employment service, and trade papers or magazines which, by producing 1.1, 1.5, and 1.5% of the employment portion gained, respectively yielded just over 4% of all new jobs.

Of somewhat greater success in terms of job offers were advertisements in professional journals (3.9%), executive recruitment services (3.3%), and the college alumni placement office (2.8%). Together accounting for some 10% of all new positions found, these strategies might be pointed up as the first to yield any significant results. Two search strategies—newspaper advertisements and private employment agencies—are from two to three times as effective as the above in yielding employment positions. Producing 9.2 and 7.4% of all employment positions, respectively, these two strategies yielded almost 17% of the new jobs accepted.

Easily the most effective search strategies, accounting for 67% of all new jobs found, are the categories "friends and relatives" and "direct application." With 30.6% for friends and relatives and 36.3% for direct application, these strategies individually account for a larger proportion of jobs found than all other search strategies combined. Indeed, their effectiveness is difficult to question.

Given the array of possible search strategies which scientists and engineers may use to find employment, the most relevant question to ask is how efficiently these individuals use the variety of job sources. To answer this question, the average intensity of utilization and the payoff matrix were compared by use of the rank order correlation coefficient.[9] The resulting coefficient is .9604, indicating a high degree of correspondence between the effort made and the return or payoff to that effort. In other words, the results for the aggregate sample indicate that scientists and engineers have a fairly accurate idea of the relative yields of different search strategies and use them in relation to their probable effectiveness.

This aggregate view of the market, however, hides much of what is important. The market, as has been demonstrated on occasion after occasion, is a process. This process occurs at different times, with different people involved, all within a changing economic climate. To summarize the market is to miss some distinctions which must be made. Therefore, the task at this point becomes one of expanding the analysis to investigate the market in light of a variety of possible situations.

The State of the Labor Market and Job Search

There has been substantial concern about the problem of unemployment as it relates to scientists and engineers. There have been cyclical movements of considerable magnitude in the employment of scientific personnel—particularly engineers—in the postwar period. Are these fluctuations likely to

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9 The rank order correlation coefficient is used in this situation because it allows for interpersonal comparison. That is, by comparing on a rank order basis, it can compensate for the fact that respondents may have different perceptions of the intensity with which they search for employment.

have considerable impact on the process of employment search? What are the effects of unemployment on the utilization of, payoff to, and effectiveness of the various search strategies?

To answer these questions, the data from the sample were analyzed according to two criteria. One was the overall level of economic activity as measured by the level of unemployment for engineers. The other was the length of time between jobs, on the assumption that a poorer economic situation would be implied by a longer length of time between a given job and the subsequent one.

The data for assessing job search and efficiency, in relation to the unemployment level at the time of job search, are summarized in Tables 2, 3, and

Table 2
AVERAGE INTENSITY OF UTILIZATION OF FOURTEEN JOB
SEARCH STRATEGIES, BY LEVEL OF UNEMPLOYMENT

Search Strategy	Years of High Unemployment	Years of Low Unemployment
Newspaper advertisements	2.08	1.90
Advertisements in professional journals	1.56	1.71
College alumni placement office	1.38	1.34
Professional placement center of state employment service	1.38	1.31
Out-placement service provided by previous employer	1.18	1.06
The "Greensheet" or other employment newsletter	1.11	1.08
Trade papers or magazines	1.47	1.44
Professional meetings	1.33	1.29
Private employment agencies	1.70	1.69
Executive recruitment services	1.46	1.32
GRAD computerized resume placement service	1.04	1.09
Technical services agencies (i.e., employment "job shops")	1.12	1.14
Friends and relatives	2.10	1.98
Direct application	2.78	2.50

Source: Azevedo, 191.

4. The most striking immediate conclusion from Table 2, which compares utilization of search strategies in "good" and "bad" years,[10] is that, with only

10 "Good" and "bad" years were determined by use of the unemployment rate data generated in Azevedo, Appendix Table B-1. These data produced estimates of the unemployment rate among engineers for the period 1950 through 1970. The criterion used for dividing the sample into one group which made job changes in "good" years and one which made job changes in "bad" years was whether in a particular year the unemployment rate among engineers was below or in excess of 1.3%.

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three exceptions, all search strategies were used more intensively in years of high unemployment than they were in years when unemployment was low. A depressed state of the labor market serves to induce scientists and engineers to exert extra effort in their desire to find employment.

Those strategies which showed the largest differences in utilization were out-placement services of previous employers, executive recruitment services, friends and relatives, and direct application. The latter three of these provide perhaps the most direct means of gaining access to information concerning possible employment. The greater use of out-placement services during years of high unemployment reflects the fact that when an economic downturn forces employers to cut back their labor forces, many individuals make an extra effort to find employment for their departing employees. The greater utilization of executive recruitment services in years of depressed labor markets reflects at least two factors. One is the relative success of executive recruitment in obtaining employment, while the other is the effort to move out of a technical position with the risk of possible layoff into an executive position which is expected to yield more stable employment.[11]

The three search strategies which were used less intensively in times of high unemployment—advertisements in professional journals, the computerized resume service, and employment job shops—have certain characteristics which could lead to this result. The professional journals have the problem of being oriented toward technology rather than the current state of the labor market. When the demand for labor falls off, they are likely to tend more toward their primary function and away from the secondary one. The computerized resume service has the deficiency of requiring some period of time between initial effort and actual contact with the employment possibilities. Employment job shops clearly function best in times of high levels of demand for labor. These agencies supply workers for short-term employment when companies need expanded work forces to expedite rush projects. In periods of poor labor markets, such workers are available without resort to the job shop as an employment source.

The payoff matrices associated with various strategies of job search in periods of high and low unemployment are presented in Table 3. The most successful search strategies in both types of labor market are the same: newspaper advertisements, friends and relatives, and direct application. However, one of these—use of friends and relatives—is more successful in "good" years (times of low unemployment). The reverse is true of the other

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[11] The data supplied by respondents would appear to support this hypothesis. In "good" years, 32.9% of the respondents indicated they moved into positions involving management. In "bad" years, by comparison, 56.6% reported new work concerned with management. While the responses to type of work performed were not mutually exclusive—that is, respondents indicated more than one type of activity at this new employment—these results do indicate a move toward management positions.

two strategies. These differences reflect the combination of the effort exerted by the individuals involved in search and the employers' demand for these individuals.

Note that three search strategies—the employment newsletters, the computerized resume service, and employment job shops—produced no employment at all in periods of high unemployment. This result supports the above-reported tendency of the group to reduce search effort through the resume service and job shops in times of bad labor markets. The lack of effectiveness of the employment newsletter is in conflict with the fact that extra effort is expended via this strategy when unemployment is high (see Table 2). However, the difference in utilization relative to the different labor market conditions is small and does not represent a grossly different pattern of behavior.

Table 3

PAYOFF MATRICES: PERCENT OF EMPLOYMENT POSITIONS YIELDED BY FOURTEEN JOB SEARCH STRATEGIES, BY LEVEL OF UNEMPLOYMENT

Search Strategy	Years of High Unemployment	Years of Low Unemployment
Newspaper advertisements	10.5	8.9
Advertisements in professional journals	2.0	4.8
College alumni placement office	3.9	2.4
Professional placement center of state employment service	1.3	1.6
Out-placement service provided by previous employer	1.3	0.3
The "Greensheet" or other employment newsletter	0.0	0.5
Trade papers or magazines	2.0	1.3
Professional meetings	2.0	0.8
Private employment agencies	6.5	8.0
Executive recruitment services	2.7	3.8
GRAD computerized resume placement service	0.0	0.3
Technical services agencies (i.e., employment "job shops")	0.0	0.3
Friends and relatives	26.9	32.1
Direct application	40.5	34.6

Source: Azevedo, 194.

Table 4

RANK ORDER CORRELATIONS BETWEEN INTENSITY OF UTILIZATION AND PAYOFF MATRICES, BY LEVEL OF UNEMPLOYMENT

Years of High Unemployment	Years of Low Unemployment
.9198	.9429

Source: Azevedo, 195.

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Table 5

AVERAGE INTENSITY OF UTILIZATION OF FOURTEEN JOB SEARCH STRATEGIES, BY LENGTH OF

TIME BETWEEN JOBS, TOTAL SAMPLE

Search Strategy	Total Sample	0 Weeks	1 Week	2 Weeks	3 Weeks	4 Weeks	8 Weeks	12 Weeks	16 Weeks	20 Weeks	24 Weeks	28 Weeks and Over
Newspaper advertisements	1.96	1.85	1.67	2.05	3.67	1.76	2.72	2.20	2.13	3.00	1.67	2.50
Advertisements in professional journals	1.67	1.64	1.52	1.65	2.75	1.82	1.76	1.50	1.75	1.75	2.00	1.65
College alumni placement office	1.35	1.29	1.17	1.33	2.25	1.54	1.38	1.00	2.25	1.75	1.33	1.79
Professional placement center of state employment service	1.35	1.22	1.21	1.39	1.00	1.41	2.00	1.33	2.25	1.75	1.00	2.00
Out-placement service provided by previous employer	1.10	1.10	1.04	1.09	1.00	1.15	1.16	1.13	1.00	1.50	1.00	1.18
The "Greensheet" or other employment newsletter	1.09	1.09	1.08	1.09	1.00	1.09	1.12	1.13	1.25	1.00	1.00	1.13
Trade papers or magazines	1.46	1.47	1.25	1.46	2.67	1.47	1.60	1.14	1.63	1.75	3.00	1.47
Professional meetings	1.29	1.28	1.17	1.42	1.00	1.32	1.32	1.50	1.00	1.75	1.00	1.44
Private employment agencies	1.70	1.59	1.37	1.70	1.75	1.90	2.50	1.56	2.38	2.50	2.00	2.05
Executive recruitment services	1.37	1.33	1.21	1.39	1.67	1.24	1.60	1.78	1.00	1.00	2.00	1.78
GRAD computerized resume placement service	1.08	1.04	1.04	1.14	1.67	1.12	1.20	1.00	1.00	1.00	1.33	1.06
Technical services agencies (i.e., employment "job shops")	1.13	1.10	1.10	1.12	1.00	1.03	1.32	1.22	1.38	1.50	2.00	1.19
Friends and relatives	2.00	1.90	2.15	2.11	2.00	2.14	2.19	2.55	2.25	1.50	3.33	1.78
Direct application	2.61	2.49	2.48	2.70	4.00	3.52	2.82	2.00	1.90	2.50	2.00	2.55

Source: Azevedo, 196, 197.

Table 6

PAYOFF MATRICES: PERCENT OF EMPLOYMENT POSITIONS YIELDED BY FOURTEEN JOB SEARCH
STRATEGIES, BY LENGTH OF TIME BETWEEN JOBS, TOTAL SAMPLE

Search Strategy	0 Weeks	1 Week	2 Weeks	3 Weeks	4 Weeks	8 Weeks	12 Weeks	16 Weeks	20 Weeks	24 Weeks	28 Weeks and Over
Newspaper advertisements	9.1	5.7	7.9	0.0	12.5	8.3	36.4	0.0	0.0	0.0	0.0
Advertisements in professional journals	5.1	3.8	0.0	25.0	0.0	4.2	0.0	0.0	0.0	33.3	4.8
College alumni placement office	2.4	0.0	3.2	0.0	2.5	4.2	0.0	0.0	0.0	0.0	14.3
Professional placement center of state employment service	1.4	1.9	1.6	0.0	2.5	4.2	0.0	0.0	0.0	0.0	0.0
Out-placement service provided by previous employer	0.7	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
The "Greensheet" or other employment newsletter	0.3	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trade papers or magazines	1.7	1.7	1.6	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Professional meetings	0.7	0.0	3.2	0.0	0.0	4.2	0.0	0.0	0.0	0.0	4.8
Private employment agencies	5.4	5.7	6.3	25.0	15.0	16.7	0.0	50.0	0.0	0.0	0.0
Executive recruitment services	4.0	5.7	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAD computerized resume placement service	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0
Technical services agencies (i.e., employment "job shops")	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0
Friends and relatives	29.3	44.3	33.3	0.0	17.5	33.3	45.5	37.5	0.0	66.7	28.6
Direct application	38.2	26.4	39.7	25.0	45.0	20.8	18.2	18.2	66.7	0.0	47.6

Source: Azevedo, 199, 200.

The rank order correlation coefficients in Table 4 give overall measures of the effectiveness of job search in periods of high and low unemployment. These indicate that search in years of high employment is slightly more effective than in years of high unemployment. This might be expected. While engineers and scientists search more intensively in bad times, their extra efforts will extend to less productive methods of search. A good labor market implies that a more careful search can be carried out because of easier access to employment information.

Table 5 shows the average intensity of utilization of search strategies by the length of time between employments. While this average may not apply for any individual situation, more than likely the length of time between jobs is directly related to the level of unemployment.

The results of Table 5 indicate that, for all strategies save one, utilization patterns do not change as one becomes further removed from his previous employment position. The exceptional case, use of private employment agencies, generally receives increasing utilization as the period of unemployment becomes longer. For the other search strategies, use varies in intensity independent of the duration of unemployment.

Some differences do show up, however, in the payoff matrices which are presented in Table 6. Absolute payoff of search strategies generally diminishes rapidly after two weeks out of work. After that point, no less than five of 14 (36%) search strategies fail to produce any employment. From eight weeks on, four of the listed strategies (out-placement service, employment newsletters, trade papers, and executive recruitment services) failed to lead to a job. After sixteen weeks the above four were joined by three others (newspaper advertisements, professional placement center of the state employment agency, and the computerized resume service), producing a situation where a full one-half of the search strategies yielded no employment.

On the other side of the coin, the only search strategies which hold up throughout are friends and relatives and direct application. Other search strategies, notably newspaper advertisements, professional journals, trade papers, and private employment agencies, were very important sources of employment at specific times. There is, however, no pattern to these sporadic occurrences. The situation, then, is that the person out of work not only finds it generally difficult to obtain employment because of the state of the economy, but also finds the problem compounded by the fact that most search strategies are no longer productive.

This general result might lead one to conclude that the labor market is less efficient the longer an individual is out of work. This conclusion is not fully supported by Table 7, which lists the rank order correlation coefficients between intensity of utilization of search strategies and their associated payoff matrices. Table 7 indicates that there is a general downward trend in the value of the rank correlation coefficients as the number of

Table 7
RANK ORDER CORRELATIONS BETWEEN INTENSITY OF UTILIZATION AND PAYOFF MATRICES, BY LENGTH OF TIME BETWEEN JOBS

Weeks Between Jobs	Rank Order Coefficient
0	.9659
1	.8516
2	.8154
3	.6769
4	.8022
8	.7626
12	.7813
16	.6637
20	.3835
24	.6341
28 and over	.5363

Source: Azevedo, 201.

weeks between jobs increases. However, the trend is far from monotonic. The value of these coefficients increases substantially at four weeks and again at 24 weeks, reflecting the success of friends and relatives and direct application in both of these cases and, additionally, newspaper advertisements after four weeks of unemployment. Relative low points occur at three, eight, and 20 weeks between jobs. The overall conclusion to be drawn from these results is that the duration of unemployment has a very complicated, less than fully direct, relationship to job search. Time without work induces individuals to resort to different search patterns and yields resulting differences in efficiency. The greater the time without a job, the higher the possibility that knowledge of employment will be gained as the result of chance rather than effort.

Summary and Conclusions

To completely summarize an investigation of the structure of the labor market requires sifting through countless interactions of almost unlimited variety. The labor market for scientists and engineers, while different from other labor markets in many respects, does have some strong similarities.

Considering the aggregate results, the two search strategies which were most intensively used and most successful were direct application and contact through friends and relatives. The next most intensively used strategies, which were considerably less successful, were newspaper advertisements and private employment agencies. At the other extreme, the least successful search strategies were the computerized resume service, the "job shops," and the employment newsletters. This payoff pattern can be explained by con-

sideration of the information flows which these search strategies allow.

The reasons for use of direct application are obvious. Whether done by mail or plant visit, the engineer or scientist applying for a position is very likely to be relatively well aware of the general climate surrounding those firms to which he is applying. He is not going to consider, except under extreme circumstances, applying to those positions which appear outright to be undesirable. The use of friends and relatives reflects a similar set of characteristics. By consulting with these people, the individual desirous of changing jobs can learn a great deal about any possible employment positions, for he has access to inside information which is unavailable under normal circumstances. Similarly, the newspapers and private employment agencies provide considerable, though not so complete, information about individual positions. Both of these, and particularly newspaper advertisements, provide a prescanning option which allows selection on the part of the job candidate as to which employers he chooses to contact.

By comparison, the poorly effective search strategies—the "job shops," the computerized resume service, and the employment newsletter—are unfortunately limited in the amount and/or form of information provided. The scientist or engineer applying to the employment job shop is very much in the dark as to the nature of those jobs to which he will be directed. One need only read employment newsletters or the output of the computerized resume service to note that they often provide only very limited information concerning the jobs they proffer. At times the listed items are almost cryptic. Certainly these latter search strategies are limited in their ability to transmit the information which is desired by the employment aspirant.

Beyond this fundamental concern with the basic nature of the information transmitted by individual search strategies lies concern with the speed with which this information is communicated. The factor of speed relates to the concept of "immediacy" in a market. Job candidates wish to acquire the necessary information about any employment possibilities as quickly as possible. This is as true for the employed individual, who, once he has decided to change employment positions,[12] would like to get started at a new job, as it is for the unemployed who may simply wish to find a position—almost any position.

In either of the above cases, there is the fact that information sources such as direct application, friends and relatives, newspaper advertisements, and private employment agencies provide information almost immediately. On the other hand, the less successful search strategies—employment job shops, employment newsletters, and the computerized resume service—all require two stages of operation. The prospective job changer must make

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[12] Perhaps few are more frustrated than the engineer or scientist who feels his services could be put to better use elsewhere.

contact with the information source and then obtain a subsequent meeting with the employer. These acts take time and effort—perhaps too much for them to be effective in some instances.

Search strategies with intermediate levels of success—advertisements in professional journals, trade papers, college alumni offices, the state employment service, and executive recruitment services—are limited in these same two respects. They are either infrequent in occurrence or lack "immediacy" (as is the case with professional meetings) or perhaps both (which is the situation for the public employment service which, because of its generally unfavorable reputation, may deal only in relatively poorer jobs, submitted infrequently, with limited information available); they suffer from the problems of being unable to transmit sufficient information (as is often true of trade papers).

Only when unemployment becomes a problem and persists does the individual engineer or scientist take the time to intensively investigate the relatively unsuccessful employment sources.[13] This is the same thing as saying that when the condition of the labor market deteriorates, the behavior of the participants responds and search efforts are expanded. But of more general significance is the overall pattern of job search, which exists in both good and bad times.

The most striking aspect of the process of job search among scientists and engineers, as noted earlier, is the remarkable similarity between their successful search patterns and those of manual workers reported in other studies. Table 8 presents the payoff matrices for five types of job search strategy for the engineer-scientist sample and those from the studies of Lloyd Reynolds and Joseph Shister and Charles Myers and George Shultz.[14] Perusal of the table reveals an amazingly consistent set of results. In all three samples, the most successful strategies are friends or relatives and direct application. Newspaper advertisements and the state employment service are at the other end of the spectrum. Throughout, similar patterns of payoff exist.

It should be noted, however, that there are differences in the level of return among the samples. The payoff from using the state employment service is much lower for the scientists and engineers than it is for either of the two groups of production workers. This difference reflects the generally lower level of attempted utilization of this search strategy by individuals with scientific and technical training. By way of comparison, the payoff to direct application is higher for the scientists and engineers than it is for the

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13 Obviously this does not mean that such employment strategies will be more effective for the unemployed. Rather it is an indication that in desperation a greater effort will be extended, as discussed earlier.

14 Lloyd G. Reynolds and Joseph Shister, *Job Horizons* (New York: Harper and Row, 1949); and Charles A. Myers and George P. Shultz, *Dynamics of a Labor Market* (New York: John Wiley & Sons, 1951).

Table 8

PAYOFF MATRICES: PERCENT OF EMPLOYMENT POSITIONS YIELDED BY FIVE SEARCH STRATEGIES, SCIENTIST AND ENGINEER SAMPLE, AND TWO PRODUCTION WORKER SAMPLES

	Engineer-Scientist Sample[1]	New Haven, Connecticut, Sample[2]	Nashua, New Hampshire, Sample[3]
Newspaper advertisements	9.2	9.0	5.5
State employment service	1.5	13.0	3.0
Friends or relatives	30.6	27.5	38.5
Direct application	36.3	31.0	17.5
All other	22.4	19.5	35.5

Note: Categories have been collapsed for comparison.

Sources: [1] Table 1.

    [2] Lloyd G. Reynolds and Joseph Shister, *Job Horizons* (New York: Harper & Row, 1949), 39.

    [3] Charles A. Myers and George P. Shultz, *Dynamics of a Labor Market* (New York: John Wiley & Sons, 1951), 48.

production worker samples. The same can be said, with less emphasis, for the payoff to use of newspaper advertisements. This reflects, in part, the high level of attempted utilization of this strategy by the technically trained. Obviously, these payoff levels reflect the different choice patterns of the technically trained and the production workers.

But it is the similarities which are significant in that they highlight the strong common links which exist across all subsectors of the labor market. The fact that both groups rely on friends and relatives and direct application for employment has significant implications for the efficiency with which labor markets operate. This is especially true for the science and engineering fields, where a technologically advanced job search machinery, using the computer and other advantages of the day, has been developed. It cannot be concluded that this sophisticated set of market tools does not work . . . only that it does not work well. And the reasons why it does not work are obvious.

To meet the criterion of efficiency, any search strategy must provide high quality information about the precise nature of any possible positions as well as transmit this information in a relatively short period of time. This implies that, in terms of manpower policy, we need to make the more highly refined sources of employment information more responsive to market phenomena. Therefore we must make access to them easier and quicker as well as improve the quality of the information which they transmit. To accomplish this, it seems most desirable to limit the breadth of job classifications covered by any particular search technique and expand the intensity with which it is involved in those fields of specialization which it covers, for

it is via a more effective job search system, through the use of more efficient employment "agencies," that our economy can achieve an optimum allocation of one of its scarce resources—scientific manpower.

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EMPIRICAL GENERALIZATIONS ON LABOR TURNOVER

B. W. Anderson

Introduction

The purpose of this article is to present a number of empirical generalizations concerning labor turnover. These empirical generalizations were formulated by a search and analysis of much of the literature and research on labor turnover.

Each generalization involves the relationship of labor turnover to a specific variable. The variables under investigation are the following: economic conditions, age, sex, marital status, size, race, length of service, absenteeism, skilled and unskilled workers, blue-collar and white-collar workers, professionals, day of the week, month of the year, government ownership, nationality, union membership, pension plans, homeownership, rural and urban location, migrants, and personnel programs.

Some of the above variables have been studied and researched much more completely than have others. As a result, the empirical generalizations resulting from the variables which have been studied more completely will represent, to that extent, a statement of stronger foundation. This does not mean that the generalization itself is stronger or more accurate than the other generalizaions, but merely that the empirical data from which it was drawn are more numerous and available.

Since measurement is a vital part of any labor turnover analysis, a brief review of measurement methods precedes the empirical generalizations.

Measurement of Labor Turnover

One of the major problems in interpreting data and research on labor turnover is that the measure of such turnover is not consistent and/or is not specified. As a result, it becomes difficult to draw meaningful generalizations from such data without further interpolation, and in some cases it becomes an impossibility to do so. The lack of meaningful generalizations means that frequently an individual research project remains just that—an individual project—and in many cases does not contribute to the broad understanding of labor turnover. Therefore, it is very important that the method used to measure labor turnover be specified and fully explained in each case.

Mobility and turnover are often confused with each other and used inter-

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changeably. Analysis of mobility requires a comparison of the worker's status before and after a labor market transaction—for example, a change of jobs, a move into or out of employment, or into or out of the labor force. Turnover, on the other hand, is based on a count of separations or accessions. Mobility is movement.[1] Turnover is but one facet of mobility.

There are at least 30 measures of turnover already developed, only a few of which are used consistently. A presentation and explanation of the major measures of labor turnover follows.

Accession rate and separation rate

Accessions are often thought of as merely additions to employment and are expressed as a rate.

Separations are terminations of employment. Terminations can be broken down into two specific categories, those initiated by the employer (layoffs, dismissals, discharges) and those initiated by the employee (quits, or voluntary separations). Thus the quit rate is a specific kind of separation rate and should be so distinguished. The separation rate is often referred to as the "crude" rate when it involves both kinds of categories. The separation rate used as a "crude" rate is found in the following manner:[2]

(number of leavers in a period / average number employed in the period) $\times$ 100

Frederich Gaudet uses yet another method to arrive at both the accession and separation rate.[3] Given the following:

A = accessions (hires and rehires),

S = separations,

F = number of employees on payroll at beginning of period,

L = number of employees on payroll at the end of period,

$N = (F + L) / 2$, average number of employees on payroll for a specific period,

then the accession rate is $A/N \times 100$, the separation rate is $S/N \times 100$, or, as a comprise rate using both A and S, $(A + S)/2N \times 100$.

Replacement rate

In any given period the lower of the two rates (accession and separation) may be referred to as the replacement rate for that period.[4]

Wastage rate and survival rate

The wastage rate relates turnover to the length of stay of the new workers

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1 Some would say that this is "succession," which refers to the degree of membership movement through the roles of a social system.

2 R. Van Der Merwe and Sylvia Miller, "The Measurement of Labor Turnover," *Human Relations*, 24:3 (June, 1971), 233-253.

3 Frederich Gaudet, *Labor Turnover: Calculation and Cost*, A.M.A. Research Study 39 (New York: American Management Association, 1960), 13-36.

4 *International Labour Review*, "Labour Turnover: Meaning and Measurement," 81 (1960), 513-526.

with the organization. Wastage would be those leaving. The survival rate refers to those new workers still with the organization.

Instability rate

A relatively new measure of turnover, the instability rate, indicates the spread of turnover throughout the different positions in the organization. The separation rate shows the total volume of turnover in an organization in relation to the number of positions in which it could have occurred. The instability rate gives the percentage of positions in which separation actually did occur.[5] Therefore, it is possible for two organizations to have identical separation rates and completely different instability rates. The instability rate tells not only how many personnel are leaving, but also how widespread within the organization such turnover is.

A word of caution may be in order at this point. When examining the different turnover rates, one may be perfectly clear about what measure is being used and in what manner. However, one should be very careful to make sure that the length of time under examination is specified, and if any measure is going to be used for comparative purposes, that such a length of time be identical with that of other data with which it is to be compared or analyzed. Often the length of time is not made clear or is assumed to be constant by the reader of the literature.

Emiprical Generalizations

> *There is more labor turnover during periods of high employment than during periods of low employment.*

The positive correlation between the amount of labor turnover and the level of business activity has been amply demonstrated over time. The average monthly separation rate in manufacturing industries was about 4% of the employees on the payroll, both during the depressed 1930s and the prosperous years prior to 1929; but in the latter period about three-fourths of the separations were initiated by the employee, while during the 1930s only one-fourth were voluntary.[6] During the prosperous 1940s, voluntary separations were much higher than during the preceding decade.

A similar situation existed earlier in American history. The separation rates for the years 1913 and 1917-18, which were good years, economically speaking, were much higher than the separation rates for the intervening years, which were not as good economically.[7] As in the preceding paragraph, the workers researched were in the manufacturing industries.

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[5] Eugene Levine, "Turnover Among Nursing Personnel in General Hospitals," *Hospitals*, 31 (Sept. 5, 1957), 52.

[6] W. S. Woytinsky, *Three Aspects of Labor Dynamics* (Washington: Committee on Social Security, Social Science Research Council, 1942), 3-4, 47, 52.

[7] Paul F. Brissenden and Emil Frankel, "Mobility of Labor in American Industry," *Monthly Labor Review*, 10 (June, 1920), 42.

During the prosperous 1920s, about three-fourths of all separations in manufacturing were voluntary, but during the depressed 1930s, voluntary quits shrank, on the average, to one-fourth of all separations, and, in certain years, approached the vanishing point. There is evidence that during the 1950s, at least among manufacturing workers, the ratio of voluntary quits to total separations was lower than in the 1940s. The average monthly separation rate in manufacturing between 1954 and mid-1959 was in no year higher than 3.6%, and the corresponding quit rate ranged between .9% in 1958 and 1.6% in 1955 and 1956. Thus, even in the relatively full employment years of 1955 and 1956, voluntary quits constituted less than half of total separations.[8]

In the United States a preliminary check of the quit rates reveals two overriding influences which produce a great deal of the variation. One of these is the business cycle. If the average monthly quite rate is plotted against the rate of unemployment (as a percentage of the civilian labor force), the explained variance is 39.8% for the years 1910-56. The corresponding figures for the 1930-56 period is 70.0% (data are more reliable since 1930). In other words, 70% of variations in the quit rate during this period can be said to be associated with variations in the employment rate. If a more refined alternative approach is used, about 85% of the variations in the quit rate since 1930 can be explained by variations in the unemployment rate.[9] The difficulty with using the ratio of unemployment in the above study is that it refers to the labor force as a whole, whereas the available quit rate data refer to manufacturing workers only.

Additional study has shown that when a worker has assurance that another job is available (full employment), he is more apt to quit his present job. The increase in the quit rate in the plants of the Trenton, New Jersey, work area reflected this job availability.[10]

Not only has this generalization concerning employment been shown to be very solid in the United States; it appears to be just as solid on an international basis. In Sweden this has been shown by a study of the iron and steel industry at the beginning of the 1950s. In 1952 the demand for labor was sharply reduced. As this reached a low level at the outset of 1953, the work force also began to shrink. In the ensuing 18 months the number employed fell off by about 5.5%. This decline was paralleled by a fall in the separation rate.[11]

8 Herbert S. Parnes, "The Labor Force and Labor Markets," in *Employment Relations Research*, ed. by H. G. Henemans, et al. (New York: Harper & Row, 1960), 18.

9 Arthur M. Ross, "Do We Have a New Industrial Feudalism?" *American Economic Review*, 48:5 (December, 1958), 905-909.

10 Sherril Cleland, *The Influence of Plant Size on Industrial Relations* (Princeton: Industrial Relations Section, Princeton University, 1955), 33.

11 Magnus Hedberg, *The Process of Labor Turnover* (Stockholm: The Swedish Coun-

In Japan the same thing was shown to be true of the situation in the coal mining industry, which also faced the crisis of declining demand.[12]

In Great Britain, research shows that labor turnover tends to vary in the opposite direction of changes in the volume of unemployment. Full employment is associated with a high average rate of labor turnover in industry as a whole. However, it should be noted that turnover does not appear to be highly sensitive to small changes in the employment rate.[13] Additional evidence suggests that regional differences in the level of labor turnover are linked with regional differences in the level of unemployment. An examination of the trend of the labor turnover rate in Great Britain shows that there has been a marked reduction in the level of labor turnover from the period of full employment to the period of less than full employment. From the first half of 1951 to the first half of 1952, the above trend was shown to be true in 30 out of 35 factories not directly hit by the trade recession which experienced no redundancy of labor during the first half of 1952.[14] There is additional evidence to demonstrate that there is a positive relationship between labor turnover and the level of employment in Great Britain.[15] This evidence is consistent with our stated generalization.

There is no available significant research which would indicate that the generalization concerning the positive correlation between labor turnover and business activity is not valid.

There is more labor turnover among younger workers than older workers from age 20 to 65, with the most active labor turnover in the early twenties and then a steady decline until age 65.

Much of the data dealing with age is to be found in mobility studies, as well as in turnover studies. Some researchers would go so far as to state that the relationship which finds mobility and turnover declining with advancing age has been conclusively established. There is some evidence, however, that workers in their teens may be no more mobile, or perhaps even less mobile, than workers in their early twenties.[16]

For both male and female white workers the inverse relationship between age and mobility persisted, but among blacks of both sexes, relatively more

cil for Personnel Administration, 1967), 41.

[12] Koya Azumi, *Higher Education and Business Recruitment in Japan* (New York: Teachers College Press, 1969), 33.

[13] Joyce R. Long, *Labour Turnover Under Full Employment*, Limited Edition, Monograph A2 (Birmingham: Faculty of Commerce and Social Science, 1951), 117.

[14] Hilde Behrend, "Absence and Labour Turnover in a Changing Economic Climate," *Occupational Psychology*, 27 (1953), 78.

[15] P. H. Cook, "Labour Turnover Research," *Journal of the Institute of Personnel Management*, 33 (1961).

[16] Herbert S. Parnes, *Research on Labor Mobility: An Appraisal of Research Findings in the United States*, Bulletin 65 (New York: Social Science Research Council, 1954), 102.

workers in the older age groups than in the younger groups had worked for more than one employer. These results call attention to the fact that the age interval used in classifying the data may conceal relationships between age and mobility and/or turnover.[17]

Palmer found that the younger the worker, the higher the average number of jobs held during the period 1940-49, and that mobility decreases as age increases from 20 to 65. This finding is not quite as consistent for women as for men, but nonetheless is still consistent. Sometimes over age 65 there may be an increase in mobility.[18]

In Sweden separations taper off sharply with rising age, but with a minor difference between men and women also.[19]

In Great Britain the relationship between labor turnover of adult workers (20-26) and their age is clear. Until the stage of retirement is reached, increasing age is accompanied by a marked decline in turnover. The available material indicates that even when their length of service is the same, older workers tend to have a lower turnover than younger ones.[20]

The general pattern, valid for both men and women, is one of low mobility and turnover up to the age of 20, a very high rate of job changing through the early twenties, and then a steady decline through the remaining working career.[21] Going back into the early 1900s in the few factories which reported labor turnover rates classified by the age of workers, the turnover of young men and girls was decidedly higher than that of the rest of the working force.[22]

Parnes goes so far as to say that an inverse relationship between turnover and age has been conclusively established.

In a Bureau of Employment Security survey of turnover rates in a number of metropolitan areas in 1956, annual quit rates for both men and women were found to be twice as high for those under 45 and for those 65 and over.[23]

Findings in Japan were such that a negative correlation between age and change of employers was justified; that is, the younger the age, the higher the mobility.[24]

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17 Ibid., 103.
18 Gladys L. Palmer, *Labor Mobility in Six Cities* (New York: Social Science Research Council, 1954), 40.
19 Hedberg, op. cit., 48.
20 Long, op. cit., 64, 70.
21 Organization for Economic Cooperation and Development, *Wages and Labour Mobility* (Paris: July, 1965), 55-56.
22 Sumner H. Slichter, *Turnover of Factory Labor* (New York: D. Appleton and Company, 1919), 76-84.
23 Parnes, *Employment Relations Research*, 21.
24 Azumi, op. cit., 34-35.

While mention is made, at least once, of the age of 30 as the lower limit of the age bracket for decreasing turnover, such a claim has not been fully justified, since it could just as well be anywhere between 25 and 30.[25]

The results of other research concerning age and turnover—Hulin, 1956; Levin, 1957; Shister, 1950; Ross, 1957; Kitagawa, 1953—all tend to support the stated generalization.

Kitagawa's analysis of the data collected in the six-city survey showed that the inverse relationship between age and mobility remained unchanged when various combinations of the factors of migrant status, occupation, industry, education, time spent in labor force, and veteran status were held constant. Of all the characteristics studied, the most clearly associated with mobility is age.

> *There is more labor turnover among unskilled workers than among skilled workers during bad economic conditions.*

This generalization has been the subject of considerable investigation. Findings of early studies revealed that turnover rates were much higher for unskilled workers. In the turnover studies of 1913-14 and 1917-18 conducted by Slichter (1919), the turnover rate of unskilled laborers was considerably higher than that of skilled workers. In these studies a skilled worker was defined as one who possesses all-around knowledge and who does work which requires an apprenticeship training or the equivalent.[26]

More recent studies, on the other hand, have implied that the opposite relationship may be nearer to the truth.[27] These studies indicate that dissatisfied skilled workers are the group most likely to move from job to job without intervening unemployment when times are good.

Additional research shows that occupational structure of the industry appears to have a negligible influence on involuntary turnover.[28] Similarly, Burton and Parker conclude, "There is no evidence that the percentage of all employees in each industry who are production workers are related to voluntary mobility."[29]

Recent research also shows that better educated (in this case, more highly skilled) workers get ahead by changing jobs, and that the less educated (unskilled) stay behind and move into higher paying but not higher skilled

[25] H. Behrend, *The Manchester School of Economics and Social Studies*, 62.

[26] Slichter, op. cit., 57-74.

[27] Sara Behman, "Wage Determination Process in U.S. Manufacturing," *The Quarterly Journal of Economics*, 82:1 (Feb., 1968), 121.

[28] Walter Oi, *Fixed Employment Costs and Labor Turnover in Manufacturing Industries* (Evanston: Transportation Center and Department of Economics, Northwestern University, undated).

[29] John Burton, Jr., and John Parker, "Interindustry Variations in Voluntary Labor Mobility," *Industrial and Labor Relations Review*, 22:2 (Jan. 1969), 214.

jobs. Higher skilled jobs, meanwhile, are filled by better educated workers who have quit other employers.[30]

Recent studies done in Great Britain comparing the quit rate (which in this case was not the quit rate as we defined it previously, but rather the separation rate) with skill levels found that there was no significant relationship between the two. It should be pointed out, however, that the skill categories used were skilled and semiskilled. Unskilled was not used as a category.[31]

In spite of the above evidence which contradicts our generalization, the vast majority of research tends to support the generalization. In Germany, in 1961, 16.7% of unskilled laborers changed employers, the corresponding figure for skilled workers being 11%. Similarly, the quit rate among unskilled workers in large firms in Lombardy (Italy) was 27% in 1961, against a figure of only 6% for skilled workers. In the United States, the amount of job changing of unskilled workers outside agriculture and mining is the highest of any of the occupational categories for which data are available.[32]

Palmer has also shown that skilled craftsmen hold fewer jobs over a ten-year period than do male operatives or laborers, and that job mobility is relatively low in occupations for which extensive training or experience is required.[33] Men on skilled work usually have the lowest turnover, and those on unskilled work the highest; the turnover of semiskilled workers usually lies between these two extremes.[34] In addition, she found that turnover among men in a factory varies greatly according to the skill which the production methods require. The skilled workers have much the lowest turnover.

Much additional evidence can be brought forth to support the stated generalization such as Christopher, 1959; Leving, 1957; Behrend, 1955; Shott, 1963; and Shister, 1950.

A problem one must be aware of when dealing with this generalization is that the method used to define and measure skilled and unskilled workers often varies from study to study. When such is the case, it becomes difficult to make valid comparisons between them for generalization purposes.

While recent research indicates that the stated generalization is not as solid as it once was thought to be, the vast preponderance of evidence still supports it.

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30 Ivar Berg, *Education and Jobs: The Great Training Robbery* (New York: Praeger Publishers, 1970), 91.

31 Geoffrey K. Ingham, *Size of Industrial Organization and Worker Behavior* (Cambridge: Cambridge University Press, 1970), 23-24.

32 Organization for Economic Cooperation and Development, op. cit., 62.

33 G. Palmer, op. cit., 125-126.

34 Long, op. cit., 80, 118.

In similar occupations and skill levels, there is little difference in labor turnover between men and women.

There is more turnover among married women than among single women.

There is more turnover among women than among men in manufacturing industries.

The general belief has been that women have a higher labor turnover rate than men. However, the turnover of women in some instances is no higher, or even lower, than that of men employed in the same organization.

In Great Britain a study of five factories in the same organization compared the turnover of local resident single and married women with that of men. In four out of the five, single women had a lower turnover rate than men.[35] These differences in the turnover of married and single women show that a general comparison of women with men may be misleading. Since skilled workers tend to have a lower turnover than other workers, and since women are usually employed in semi-skilled and unskilled occupations, the turnover of women should be compared with that of men engaged in work requiring a similar amount of training. When this comparison was made, the findings showed that the women's turnover was usually less than that of the unskilled men, and sometimes less than that of the semiskilled men.[36]

Overall mobility comparisons, whether relating to job changes or to total separations, indicate lower turnover of female than of male labor. At the aggregate level, the ratio of female to male separation rates is 0.92 in Canada (1958-60), 0.98 in Germany (1959-62), and 0.78 in the United States (1961).[37] These figures include a sector-by-sector comparison. The notable exception is the manufacturing sector, where traditionally the majority of turnover studies takes place. This exception would account, to a large degree, for the belief that female turnover is generally higher than male turnover.

Parnes states that although men have generally been found to be more mobile than women, there is reason to believe that the reason may be due to differences between the labor force exposure of men and women and to the measures of mobility used.[38] He also states that the number of investigations that have found no significant difference or have reported higher mobility among men are too large to be ignored; as an example, a study based on a 1% sample of Old Age Survivor's Insurance (OASI) records of 1951 and 1952 indicates that 34.4% of the men and 26.7% of the women worked for two or

35 Long, op. cit., 42.
36 Ibid., 44.
37 Organization for Economic Cooperation and Development, op. cit., 60.
38 Parnes, *Research on Labor Mobility*, 141.

41

more employers during 1952. However, he implies that the general results are inconclusive.

In another article Parnes states that there are methodological difficulties that complicate the analysis of these generalizations.[39] Women have less continuous participation in the labor force and consequently a smaller potential for job movement than men. On the other hand, the intermittent labor force attachment of many women means that job separations are frequently indicative of a propensity to leave the labor force, rather than to change jobs. Finally, differences in the occupational differentials in mobility may mean that sex differentials simply reflect occupational differences.

In the Six City Study, Palmer states that when age, migrant status, and marital status are held constant at the same time, the differentials are further widened so that women appear less mobile than men. This study also showed that the percentage of women reporting work with one employer throughout 1940-49 is consistently lower than the corresponding percentage for men, except for veterans.[40]

In an earlier study (1917-18) of 45 establishments, the males had a separation rate of 6.0 compared to the females' rate of 3.7.[41] Caution is advised in interpreting these data because practically all the females were clerical employees. This study also indicated larger percentages of separating male employees are bunched in the short service periods. For those separating in less than three months, 63% were male and 50% were female. Between six months and one year, the percentages were about even. From one to five years, females had a separation rate of 18.7, compared to 11.2 for men. Finally, of the employees leaving after five years, 3.6% were males and 6.0% were females.[42]

Slichter found in his early study (1917-18) that in 10 industries the turnover of males was larger than that of female workers, while the reverse was true of three industries.[43]

It is appropriate at this point to indicate that the majority of studies have found women to have a higher turnover rate than men. Even Long's study in Great Britain, after pointing out many exceptions, reached the conclusion that women have a higher turnover rate than men; it must be noted, however, that manufacturing was the main sector researched.[44] Behrend also found in a very small study (N = 123) that the separation rate for male teachers was 10.3 and for female teachers 15.7 for the years 1946-52.[45]

39 Parnes, *Employment Relations Research*, 22.

40 Palmer, op. cit., 39-43.

41 Brissenden and Frankel, op. cit., 47.

42 Ibid., 54.

43 Slichter, op. cit., 62.

44 Long, op. cit., 42.

45 Behrend, *The Manchester School of Economic and Social Studies*, 65.

A recent study in the United States concludes as follows: ". . . the theoretical argument about the direction of the effect of female employment on an industry's quit rate was inconclusive. Nevertheless, the empirical results suggest that the higher the proportion of female employees, the higher will be the quit rate."[46]

In Japan the separation rate for women was shown to be higher than that for men. In a study of 19 large factories and 34 small ones, the highest separation encountered was 3.6 for men and 14.0 for women in the same plant.[47] In Japan women seek employment primarily for the period between schooling and marriage; as a result, their quit rate is much higher than that of men.

In several studies (Greystoke, Thompson, and Murphy, 1952, and British Institute of Management, 1949), there are indications that separation rates for women are consistently higher than those for men, but not by much.

The relationship between sex and turnover appears to be an ambiguous one, to say the least. Much additional research is needed to clarify, eliminate, or reinforce previously held concepts on the subject.

> *There is more labor turnover among blue-collar workers than among white-collar workers.*

The classifying distinction between blue-collar and white-collar workers is that the latter are salaried, and the former are paid by hourly wage rates. This distinction does not always hold true, but practically all researchers treat it as the major difference between the two groups.

Only meager data are available on the turnover and mobility of white-collar workers, but this is just one of the practical difficulties which arises when looking at white-collar workers. White-collar groups do not lend themselves as readily to unambiguous classifications by job, educational background, hierarchical status, and other relevant characteristics.

A comparison between manual workers (textiles) and white-collar workers employed in manufacturing in 1962 revealed but minor differences for men, whereas differences for women seem to increase with rising age until the age of 65, where the difference between white-collar women and blue-collar women was 15.8% greater turnover for blue-collar women. The difference in the separation rate between men in the two groups was never greater than 2.6% for any five-year period.[48]

German statistics show that the overall rate of job changing was almost three times as high for wage earners as for salary earners in 1961, a relation which held both for individual sectors of activity across the country and for

[46] John H. Pencavel, *An Analysis of the Quit Rate in American Manufacturing Industry* (Princeton: Industrial Relations Section, Department of Economics, 1970), 23.

[47] Azumi, op. cit., 32.

[48] Hedberg, op. cit., 75.

the average of all activities within each of the 13 regions. Likewise, in the Nookoping (Sweden) study, manual workers made more job shifts than white-collar workers in the 10 years 1948-58.[49] Azumi's study in Japan, although not giving statistical evidence, states that low labor mobility is associated with white-collar rather than with blue-collar workers.[50]

Studies in the United States support the stated generalization. One of the results of the Six City Study was the indication that blue-collar workers were much more mobile than white-collar workers. Using the average number of jobs held as the measure, this study shows professionals (2.4) with less mobility than all but managerial personnel (2.4); laborers have the most mobility (3.1). Clerical workers (2.6) were shown to have less mobility than craftsmen (3.1).[51]

Salaried employees, on the whole, are considerably less mobile and have fewer separations than blue-collar workers.

There is more labor turnover among employees of nongovernment organizations than among employees of government organizations.

A study conducted by the American Hospital Association and the Public Health Service showed that there was a much greater separation rate among personnel in private and church-related hospitals than in government hospitals.[52] The turnover rate for all personnel in government hospitals was 52.2, compared with the rate for church-related hospitals, which was 67.5. The difference in turnover between private and government hospitals was not significant.

There may be an exception to the stated generalization which was raised by the 1955 study done by the American Nurses Association. This study includes only nurses, while the previous study included all personnel in the hospital. The exception is that in government hospitals that are not federal, turnover may be higher.

Research and development organizations may give additional support to the stated generalization. In his study of R and D organizations, Evans hypothesized that there is more turnover in nongovernment R and D organizations than there is in government R and D organizations. He states, "This difference between the two laboratories may be due to the higher rate of turnover of professional personnel in the industrial laboratories than in the government laboratories."[53]

Sweden provides the location for a study which indicates that length of service turns out to be consistently longer for male civil servants than for

49 Organization for Economic Cooperation and Development, op. cit., 62.

50 Azumi, op. cit., 35.

51 Palmer, op. cit., 72.

52 Levine, op. cit., 51.

53 William Evans, "Conflict and Performance in R and D Organizations," *Industrial Management Review*, 7 (1965), 43.

white-collar men in manufacturing. When such a comparison is carried over to other groups, civil servants still have the longest lengths of service, followed by insurance employees, white-collar workers, and so on.[54]

If teachers are to be included as government employees, it is known that their length of service was 3½ to 20 times greater than that of factory workers.[55]

Most studies which have investigated the lower turnover in government employment generalization have concurred with it, but more studies are needed to really substantiate the generalization.

There is no consistent relationship between the amount of labor turnover, particularly voluntary turnover, and size of organization.

The findings of the previous research into the size-labor turnover relationship are, in fact, not consistent.

Studies as far back as 1918 show that both accessions and separation rates increased with size in nine firms and decreased in 35 firms.[56] However, this statement could be misleading because the quit rate was higher in larger firms. The lower turnover rate in large firms is then due mostly to the rate of involuntary separations, which in 36 cases were lower in large firms than in smaller firms.

In more recent studies involving hospitals, the instability rate among all nursing personnel was greater in large hospitals, although the size of the hospital had a varying effect on different categories of personnel.[57] In another study involving hospitals, the lowest separation rates were in small hospitals (under 50 beds). Hospitals of 500 beds or over had the next lowest separation rate, while hospitals with the highest separation rate were those in the size group from 50 to 99 beds.[58]

The Acton Society Trust found no significant correlation between the quit rate and size, stating, "But there was factory by factory, no significant correlation between voluntary labor turnover rate and the total absenteeism, nor with the size of the factory."[59] Ingham also states that no significant relationship has been discerned between organizational size and various measures of labor turnover.[60] Long states that there is no clear relationship between factory size and turnover rates, but, if anything, lower turnover rates were the more common among the smaller factories. This result disagrees with that of the British Institute of Management. However, when

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[54] Hedberg, op. cit., 77.

[55] Behrend, *The Manchester School of Economics and Social Studies*, 68.

[56] Woytinsky, op. cit., 59.

[57] Levine, op. cit., 53.

[58] W. I. Christopher, "New Horizons for Making Recruitment Effective," *Hospital Progress* (August, 1959), 62.

[59] Acton Society Trust, *Size and Morale*, Part I (London: 1953), 36.

[60] Ingham, op. cit., 25.

controls are applied to the Institute data, there was no regular trend in the relationship between factory size and turnover.[61]

In the United States a study conducted in the Trenton, New Jersey, area showed that turnover was generally lower in the smaller plants. However, this same study on the basis of limited data indicated that the group of plants with the best turnover records were the small number of marginally large plants (which were employing only slightly more than 500 workers) that were able to maintain the personal approach but were also large enough to begin enjoying the advantages of specialization.[62]

Let us now take a look at the support given to the traditional emphasis which says that the smaller the plant, the greater the turnover. Arthur Ross writes, "It is well established that large firms tend to have low turnover rates. . . ."[63] Such reasoning finds its base by going back to the early 1900s when studies appeared to show that a downward trend in mobility rates takes place as the size of the organization increases. Using what was called the flux rate, Ross found that the firms having over 1,000 employees had a turnover of 9.7, compared to 6.2 for firms having over 5,000 employees, for the year 1913. In 1917 the comparable rates were 17.3 and 11.5.[64]

Additional studies have found that, broadly speaking, the larger the firm, the lower the separation rate. Comparative data, however, must be cautiously interpreted, since internal job shifts in large firms do not appear as separations, whereas a move of similar type between two small firms would be counted as a separation. Statistics for France in 1951 and 1952 and for the United States in 1955 show a striking downtrend of labor turnover with increasing firm size.[65] In Sweden a study has found that, by and large, the separation rate increases with smaller plant size.[66]

Shister indicates that larger firms have greater opportunities for upward occupational mobility, which has the effect of reducing the volume of horizontal mobility, promoting less turnover than would be the case in smaller firms.[67] Unfortunately, he offers no evidence to support this concept.

In view of the indeterminacy of the results described above, further examination of the relationship between size and turnover is required.

There is more labor turnover among employees with shorter lengths of service than among employees with longer lengths of service.

A fact widely recognized is that workers who have been employed in one

61 Long, op. cit., 119.

62 Cleland, op. cit., 33-34.

63 Ross, op. cit., 914.

64 Brissenden and Frankel, op. cit., 44.

65 Organization for Economic Cooperation and Development, op. cit., 58-59.

66 Hedberg, op. cit., 50.

67 Joseph Shister, "Labor Mobility: Some Institutional Aspects," *Proceedings of the Third Annual Meeting of the Industrial Relations Association* (Chicago: Dec., 1950), 52.

organization for some time are, on the whole, less likely to leave that organization than workers who have been hired recently. There is much statistical evidence to support this point. Long found that by far the most unstable workers are those who have been employed for less than a year. She concludes that, other things being equal, a labor force containing many short service workers has a relatively high turnover rate.[68]

In 12 firms of the Ford Motor Company, researched in the 1930s, it was found that 68.2% of those separated for voluntary reasons had been employed less than one year. This percentage showed a steady decline until at eight years of service it was about 3%, based upon a yearly rate.[69] Parnes concludes that the probability of a voluntary job separation decreases as an employee's length of service in a particular firm increases. Moreover, the fact that there are a substantial number of workers who keep the same job for long periods indicates that, to a large extent, the same workers make job changes year after year.[70] Another often-cited study indicates that quits are most frequent during the first few months of service and diminish rapidly after that point.[71]

A study which was comprised of a sample of exit interviews indicated that a majority of labor turnovers occurred in the first six months of employment, and approximately 80% of it happened within the first year.[72]

In Japan it was found that the longer a person has been employed, the less likely it is that he will change employers, because he will have accumulated greater seniority rights and he will face greater difficulty in finding other employment.[73]

In the United States, studies revealed that job changes occur most frequently in the first year of experience in the labor market and less frequently with each succeeding year, but the amount of changing which goes on after five years is great enough to affect the ten-year average.[74] Also, in the United States in 1955, about 70% of all job separations were of persons who had spent less than a year with their employers, and a further 22% related to persons with more than one, but less than four, years of service. In terms of annual separation rate it was as follows:[75]

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[68] Long, op. cit., 52, 118.

[69] Donald A. Laird, *The Psychology of Selecting Employees*, 3rd. ed. (New York: McGraw-Hill Book Company, 1937), 28.

[70] Parnes, *Research on Labor Mobility*, 97, 107.

[71] Lloyd G. Reynolds, *The Structure of Labor Markets* (New York: Harper & Row, 1951), 22.

[72] Gerald L. Shott, Albright, and Glennon, "Predicting Turnover in an Automated Office Situation," *Personnel Psychology*, 16 (Autumn, 1963), 215.

[73] Azumi, op. cit., 36.

[74] Palmer, op. cit., 41-42.

[75] United States Department of Labor, "Private Pension Plans and Manpower Policy," *BLS Bulletin No. 1359*, 18.

Less than one year's service—150 percent;

One to four years' service—33 percent;

Five to nine years' service—11 percent.

This source suggests strongly that age and length of service have cumulative rather than interacting effects on turnover, except for very short service employees.

Ross writes that the stated generalization has prevailed as far back as labor turnover statistics have been available.[76] As early as 1913-14, Brissenden and Frankel found that 81.3% of all separations had been on the payroll less than a year, and 89.4% less than two years. For 1917-18, the corresponding figures were 83.9 and 91.0%.[77] Woytinsky, in a study involving 93 plants in 10 industry groups with a total of 194,042 employees, also found that the longer the length of service, the less the rate of turnover, going from a rate of 33.1% for under three months of service to 8.0% for five years and over.[78] A 1956 study conducted by the U.S. Bureau of Employment Security found no great change 40 years later.

In Sweden it was found that by far the greater part of separations occur after a brief employment period.[79] Hedberg's findings tended to support the idea that separations are more affected by length of service than by age (Meidner, 1954; Silcock, 1954). Other findings tend to refute this finding, so no clear-cut statement can be made on that aspect of the generalization.

Additional support for this generalization can be found in the following studies: Parnes, 1960; Van Der Merwe and Miller, 1971; Behrend, 1955; and Shister, 1950.

The only evidence uncovered that does not fully support the stated generalization is the study done by Behrend, in which she discovered while comparing school teachers and factory workers that in the factory the newcomer is the person most likely to leave, but in the school situation this is not the case.[80] This small bit of evidence needs more research.

There are more accessions in the spring and early summer months and more separations in the late summer through winter months than in other times of the year.

There are indications that certain parts of each year tend to be associated with relatively high turnover rates, particularly among young short service workers.[81] This concept was evident in the earliest studies done on labor turnover. According to Woytinsky, labor turnover (as measured by separ-

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76 Ross, op. cit., 913.

77 Brissenden and Frankel, op. cit., 54-57.

78 Woytinsky, op. cit., 60.

79 Hedberg, op. cit., 52.

80 Behrend, *Manchester School of Economics and Social Studies*, 67.

81 Long, op. cit., 117.

ations) was more extensive in summer than in winter. A crude measurement based on averaging the monthly data for all years from 1910 to 1919 indicates a peak in the second quarter and a trough in the fourth quarter, with a magnitude of variation of 6% of the working force for accessions and 5% for separations.[82]

In a study of the resignation rate per 100 employees in an eastern silk mill for the years 1915-16, Slichter pretty much agreed with the results of Woytinsky's study. The highest resignation rates were in August (4.38) and September (4.45) in 1915, and in June (5.68 and September (5.66) in 1916. The lowest rates were in January (1.52) and February (1.46) for 1915, and the same two months were low for 1916 as well.[83]

However, it is interesting to note that Brissenden and Frankel, working in approximately the same time period, found somewhat different results. Using separation rate only, they found the period from September to November had the lowest rate (3.32) and the period from March to May had the highest rate (4.68).[84] Some 550,000 individuals were involved in the study. One must realize when analyzing these data that since they are grouped by three-month periods, one month's difference in either direction could have a very substantial effect on the separation rate. Thus, the choice of specific periods is important to the final implications of this data.

Other evidence would seem to negate the previously mentioned results. Behrend reveals that the data collected in one of her studies showed that in nearly all the factories studied, workers left any time of the year with no discernible pattern.[85] This same study, however, indicated that the majority of teachers left in August, which in Great Britain is at the end of the teaching session. This last point brings to our attention that in countries which have a large collegiate population, the accessions rate may rise when school is dismissed for the year, and separations will increase when the school year begins again. These activities should be controlled in the research to keep from distorting the evidence. None of the studies indicate whether they are using data which are controlled for these items, but either way, it will influence the outcome.

In Canada during May and June, accessions are the highest and separations the lowest, while the reverse is true during December. Canadian school terms usually end in the last weeks of May. Seasonal variations in Japan have largely followed a similar pattern, at least during the past 20 years. Accessions rise sharply in March and April, the months which coincide with

[82] Woytinsky, op. cit., 19.
[83] Slichter, op. cit., 39.
[84] Brissenden and Frankel, op. cit., 50.
[85] Behrend, *Manchester School of Economics and Social Studies*, 69.

the end of school terms in Japan. Separations vary insignificantly from month to month, and toward the latter part of the year are at the same level as accessions.[86]

The end of the school term produces a peak in Swedish accessions during June. Accessions also tend to be high from August through October and low in July as many organizations are closed for vacation during this period. Separations reach their peak in August.

The separation and accession data for the United States are more irregular than for other countries. A minor increase in accession rates seems to recur each June, and a decline in accessions around year-end also appears. The quit rate formerly fluctuated greatly, but in recent years these changes have fallen to a very low level compared to former years.[87]

There is more labor turnover among nonunion workers than among union workers.

"Trade union policies have very little influence on the amount of involuntary horizontal mobility, although they affect significantly the incidence of this type of mobility. The union policies reduce the amount of voluntary mobility on the net balance."[88] The above quote is a summary statement by Shister on his view of unions and turnover. However, he does agree that in certain situations (labor shortages, information source, etc.) unions may contribute in a small way to turnover and mobility.

Ross believes that under unionism, individualistic methods of exhibiting and relieving discontent have been replaced by concerted action, which can be invoked without quitting jobs.[89] The net effect of this is, of course, to reduce turnover.

Pencavel states that "The high turnover of employment increases the cost of providing union services to an industry, so that the industries characterized by high quit rates might be expected to have a lower degree of unionism."[90]

Two additional studies of the union-turnover relationship have reached conflicting conclusions. Reynolds found that among New Haven workers, union members were less likely to have made voluntary separations within the eighteen months preceding his survey (late 1940s), but that the effect became weaker when length of service was held constant.[91] Lipset and Gordon found that the number of job shifts during a 10-year period was

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86 Hedberg, op. cit., 43.
87 Ibid., 44.
88 Shister, op. cit., 48.
89 Ross, op. cit., 915.
90 Pencavel, op. cit., 36.
91 Reynolds, op. cit., 22.

higher among union than among nonunion workers in Oakland, California.[92]

In interpreting the two studies above, one finds that the measures of mobility used are so different that the results are not really comparable. Also, most of the factors associated with unionism that are supposed to reduce mobility operate with equal force on all workers in the bargaining unit, irrespective of union membership.[93]

Although the empirical evidence concerning the relative mobility of union and nonunion workers is somewhat inconclusive, there seems to be a consensus that the net effect of trade unionism has been to diminish labor mobility.

Organizations without pension plans have no more labor turnover than do organizations with pension plans.

Data for the United States reveal that labor turnover is consistently lower among organizations with pension plans in both large and small firms, for younger as well as older workers.[94] However, it should be noted that pensioning firms might be expected to have lower turnover than nonpension firms, but not only because they have pension plans. In other words, no controls are evident in these data.

To the extent that certain pension plans are vested (transferable), the effect of pensions on mobility and turnover may be expected to weaken.

In Sweden, firms without pension plans have a larger accession rate than do firms with pension plans. However, the data related to the replacement rate for these firms are not conclusive.[95]

Shister states that negotiated pension plans will serve as an obstacle to voluntary mobility by organized workers, but he offers no evidence to back up that idea.[96] He also believes that in the absence of old age pensions under the federal government program, some employers would retain the "older" workers longer than they do now, but this also is speculation.

Ross points out that firms with pension plans generally have lower separation rates than firms without pension plans,[97] but he also states that if such firms were controlled for size and seasonal activities, the difference in the separation rate between them would disappear.

Studies by the Bureau of Employment Security revealed lower turnover

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[92] Seymour Lipset and Joan Gordon, "Mobility and Trade Union Membership," in *Class, Status, and Power*, ed. by Benedix and Lipset (Glencoe: The Free Press, 1953), 498-499.

[93] Parnes, *Employment Relations Research*, 25.

[94] Organization for Economic Cooperation and Development, op. cit., 59.

[95] Hedberg, op. cit., 51.

[96] Shister, op. cit., 44, 50.

[97] Ross, op. cit., 914.

rates in firms with pensions than in those without them.[98] However, this relationship was not consistent for all areas studied and for all industrial categories, particularly when size of firm was held constant.

Puchek has concluded, on the basis of his study of 11 pension plans in New York, that evidence does not support the widely held opinion that private pension plans restrict labor mobility.[99]

Unfortunately, much of the literature about the relationship between pension plans and turnover is based on "common sense" rather than empirical evidence.

> *There is more labor turnover among male black workers than among male white workers.*
>
> *There is relatively little difference in labor turnover between black and white female workers.*

Relatively few studies have compared the races and their relationship to labor turnover.

A study conducted in Ohio and Michigan, which both have rather large black populations, found that black workers were more mobile than nonblack workers. The difference between the two groups was due strictly to the race variable. Black women were slightly less mobile than nonblack women, while 44% of black men and only 34% of nonblack men made job changes.[100]

Aaronson and Keller found about the same relationship in their study, with the added evidence that among women, particularly those under 45, a larger proportion of whites than of blacks had more than one job.[101]

Apparently the proportion of stayers (or length of service) increases with age much more regularly among blacks than among all workers. However, additional evidence supports a correlation between net flows of labor and earnings for the black age groups 20 to 24 and 25 to 29, which is substantially more negative than those for all workers of the same age—a fact which implies greater relative amounts of involuntary mobility among black workers than among all workers in these age groups.[102]

Parnes states that the rate of job movement among blacks is apparently

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98 Bureau of Employment Security, "Older Worker Adjustment to Labor Market Practices," *BES No. R151* (September, 1956).

99 Michael Puchek, *Pension Plan Policies and Practices*, New York State School of Industrial and Labor Relations Bulletin 21 (New York: 1952), 49.

100 Donald J. Bogue, *A Methodological Study of Migration and Labor Mobility in Michigan and Ohio in 1947*, Scripp Foundation Studies in Population Distribution No. 4 (June, 1952), 26.

101 Franklin Aaronson and Ruth Keller, *Mobility of Workers in Employment Covered by Old-Age and Survivors Insurance*, U.S. Social Security Administration, Bureau of Research and Statistics Report No. 14 (July, 1946), 30-31.

102 Gallaway, op. cit., 17.

higher than among whites, at least for males. Yet he cautions against drawing conclusions from the available evidence because of what he believes to be the greater incidence of involuntary separations among black than among white workers.[103] He concludes that in the few studies on the relationship between race and turnover, the results seem to indicate greater turnover and mobility for black workers than for white workers. The difference generally exists only for men.

There are more involuntary separations among nonprofessional workers than among professional workers.

Differences in voluntary separations are slight between nonprofessional and professional workers.

A survey of labor turnover within nursing services for hospitals for the major position titles shows that staff nurses have much higher turnover (65%) than do practical nurses (37%). The measure used is the voluntary quit rate. Administrative nurses revealed a turnover rate of only 22%. However, one cannot imply that administrative nurses possess a greater degree of professional groups in the same occupation with much different turnover rates.[104]

Behrend implies that, on the whole, teachers (professionals) exhibit far lower turnover rates than do factory workers involved in manual labor.[105] Palmer concluded that, on the whole, persons in nonmanual occupations are less mobile than those employed in manual occupations. That laborers (3.1), craftsmen (2.8), and operatives (2.8) exhibit higher turnover rates than professionals (2.4) is the evidence from Palmer's study. Nevertheless, it is interesting to note in these same data that the migrants (more than one residence in 12 years) included a larger proportion of professional workers than did the nonmigrants.[106]

The available data do not permit a conclusive statement, but there is some evidence that the higher mobility rates of workers in manual occupations are partly due to the higher involuntary turnover in those occupations. The proportion of involuntary separations among all separations by the various occupational groups seems to follow this pattern. Professional workers show the lowest proportion and laborers the highest.[107]

A study conducted during the 1930s reported that workers in extractive industries (including agriculture) were the most mobile, and that professional workers were more mobile than workers in manufacturing.[108] These

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103 Parnes, *Employment Relations Research*, 22.

104 Christopher, op. cit., 62.

105 Behrend, *Manchester School of Economics and Social Studies*, 66.

106 Palmer, op. cit., 72, 126.

107 Parnes, *Research on Labor Mobility*, 83, 98.

108 John N. Webb and Albert Westefeld, "Industrial Aspects of Labor Mobility," *Monthly Labor Review*, 48 (April, 1935), 792.

data were not controlled for economic conditions, which during the 1930s may have been a dominant factor.

There is more labor turnover among workers living in densely populated areas with numerous industries than among workers living in rural areas with little available industry.

In a study of 231 hospitals reporting on their labor turnover rates, those located in farm and ranch areas demonstrated the lowest annual turnover rate (34% average) and the highest stability rate (93% average). The industrial area hospitals had by far the highest turnover rates (83% average), and an average stability rate of 67%.[109]

Behrend gives only a summary statement on the subject, which says that in densely populated areas with many factories, the turnover rate tends to be high, and in sparsely populated areas with only a few isolated plants the turnover rate is less.[110]

Long's research tends to support the stated generalization; she states that turnover tends to be higher among people who live in areas which are densely populated and have numerous factories. The further they are removed from urban areas, the lower the turnover rates seem to be for manual laborers.[111]

There is more labor turnover among organizations with noncentralized personnel programs than among organizations with centralized personnel programs.

Unfortunately, it appears as if the accepted norm in this area again lies within the realm of "common sense" rather than empirical evidence.

A study made back in the early 1900s found that firms with more or less centralized employment systems were relatively more successful in the maintenance of a stable work force than were those which were not centralized.[112]

Parnes also concludes that labor mobility will be reduced to the extent that the employer's personnel policies are successful, centralized or not.[113]

An empirical piece of work indicates that labor turnover tends to be less in hospitals with centralized personnel programs. These hospitals showed an average annual turnover rate of 52.7% (median of 58.3%), in contrast to an average of 71.7% (median of 62.5%) for hospitals with a decentralized program.[114]

There is more labor turnover among migrant workers than among non-migrant workers.

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109 Christopher, op. cit., 62.

110 Behrend, *Manchester School of Economics and Social Studies*, 62.

111 Long, op. cit., 49.

112 Brissenden and Frankel, op. cit., 46.

113 Parnes, *Research on Labor Mobility*, 132.

114 Christopher, op. cit., 62.

Palmer defines a migrant as a person with less than 12 years' residency. Using such a definition as her measure, she reports that migrants had more jobs per person than those with longer residence.[115] (If length of service had been used as a control variable, the result might have been different.)

In Great Britain the position of the worker's home has its effect on turnover, when it is situated in quite a different part of the country from the factory where he is employed.[116] When Welsh, Scots, and Irish were recruited to jobs in the Midlands, they exhibited the highest voluntary separation rates. Although no evidence is available, the same may be true among the countries of the Common Market.

There is more labor turnover among workers with records of high absenteeism than among workers with records of low absenteeism.

In Lyon's study of nurses (1966), he found that in all six of the available individual-level studies presenting both absence and turnover data, the people who eventually leave have records of significantly higher absenteeism than those who stay. The average number of times absent was higher for the nurses who left than for those who stayed for both of the half-year periods he studied.[117]

There is more labor turnover among nonhomeowners than among homeowners.

There is some evidence that homeownership tends to restrict interlocal mobility and perhaps even intralocal movement.[118] Parnes hypothesizes that homeowners place a higher value on security and stability than renters do, and this fosters a lower propensity of owners to change jobs.[119] He presents no empirical evidence to back up such a hypothesis.

When Reynolds asked manual workers in New Haven how large a wage increase would be necessary to induce them to take a job in another area, renters indicated a greater willingness to move than did homeowners.[120]

More studies which will utilize controls on age and occupation are needed to clarify this generalization.

There is more labor turnover among American manufacturing workers than among non-American manufacturing workers.

While existing data do not permit precise international comparisons (because of different measures and methods of collecting data), it does appear that the amount of job movement in the United States is considerably

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[115] Palmer, op. cit., 42.

[116] Long, op. cit., 48.

[117] Thomas F. Lyons, *Nursing Attitudes and Turnover* (Ames: Industrial Relations Center, Iowa State University, 1968), 49-50.

[118] H. G. Heneman, Jr., H. Fox, and D. Yoder, *Minnesota Manpower Mobilities* (Minneapolis: Industrial Relations Center, University of Minnesota Press, 1950), 51.

[119] Parnes, *Research on Labor Mobility*, 124.

[120] Reynolds, op. cit., 78-79.

greater than in most European countries.[121] Various studies (Christian, 1955; Clark, 1954; and Silcock, 1954) all tend to support the stated generalization.

In Japan the exit rate (quit rate) in manufacturing industries as a whole is between 25 and 30% annually, which is roughly one-half of the American rate. Using rates which are annual averages of monthly rates, Azumi found that in Japan the quit rate in 1960 was 2.1; in 1961, 2.5; and 1962, 2.4. For the United States in 1960 it was 5.3; in 1961, 4.0; and in 1962, 4.1.[122]

> *There is more labor turnover, measured as separations, on Friday (or Saturday, if a six-day work week is common) than on the other days of the week.*
>
> *There is more labor turnover, measured as accessions, on Monday than on other days of the week.*

The data collected by Behrend in her study showed that in nearly all the factories, workers left any day of the week in spite of the weekly work contract. There was no discernible pattern. Sometimes they even quit in the middle of the day.[123]

Hedberg, on the other hand, found a significant pattern, where accessions were four times the separations on Mondays, while on Saturdays the separations were six times as great as accessions; on the last two days of the week there was a surplus of separations.[124]

From the two studies above which reach such contrasting conclusions, it is difficult to say which has more weight of empirical evidence, although Hedberg's is more suspect because of its design and size.

Conclusion

Of the 21 variables which have been presented, there are two which stand out as being extremely significant. These are economic conditions and length of service.

At the other extreme is the sex variable; many differing conclusions and results make a predictive generalization on this variable very unreliable. Lack of research is not the reason for the cloudy picture surrounding the sex variable, as it is among the most researched of the variables under investigation. It may be that the variable is in a state of flux due to cultural changes in society and that a predictive generalization is not possible at this time.

The size variable also tends to be difficult to generalize because of the large number of conflicting results arising from its investigation.

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121 Parnes, *Employment Relations Research*, 19.

122 Azumi, op. cit., 38.

123 Behrend, *Manchester School of Economics and Social Studies*, 62.

124 Hedberg, op. cit., 45-46.

The remaining variables fall on a continuum between the two positions noted above.

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NEGATIVE EFFECTS AND OCCUPATIONAL UPGRADING IN A COLLECTIVE BARGAINING ENVIRONMENT

Randyl D. Elkin

Introduction

Utilizing aspects of the theory of the internal labor market,[1] this paper builds a model of occupational upgrading in a collective bargaining environment. Five hypotheses are generated from the model concerning the negative effects for occupational upgrading programs in general and for on-the-job training programs in particular. These five hypotheses are examined in the light of results from other studies of occupational upgrading. Research designs are suggested for determining the magnitude of negative effects.

Recent controversy between academic analysts and trade unionists over the existence and extent of job dissatisfaction in the American work place has once again brought attention to the role of trade unions in occupational upgrading in the work place.[2] Most of the research on unions and upgrading has been done in the apprenticeship field and on union-run programs under national on-the-job training contracts. This study is concerned primarily with the role of the union in an enterprise internal labor market situation which may or may not involve craft workers in the exclusive bargaining unit. Further, the type of upgrading program envisioned is a Manpower Development Training Act institutional or on-the-job program likely to be administered by a statewide agency rather than on a national contract basis.

Glen Cain and Robinson Hollister observed in a 1969 paper on the methodology of evaluating social action programs:

Concerning training and educational programs, in particular, two types of effects

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1 Peter B. Doeringer and Michael J. Piore, *Internal Labor Markets and Manpower Analysis* (Lexington, Massachusetts: D.C. Heath and Company, 1971).

2 For opposing viewpoints, contrast the position taken in *Work in America*, Report of a Special Task Force to the Secretary of Health, Education and Welfare, December, 1972, published in 1973 by MIT Press, Cambridge, Mass., with those of writers in the February, 1973, issue of the AFL-CIO *Federationist*, 80:2.

that have received scant investigation are "negative effects" and those which affect the structure of communities.[3]

Two of the "negative effects" suggested by Cain and Hollister are of concern here:

(a) Programs placing the hard-core poor into jobs have had, according to some reports, disruptive effects in the plant—both because of the behavior of the trainee-participants (e.g., disciplinary problems and high rates of absenteeism) and because of the special treatment which the participants received.
(b) Programs which augment the supply of workers in a particular occupation will have the effect of exerting downward pressure on the wages of existing workers in that occupation. It is worth noting that the workers earning high wages are likely to belong to unions which will block these programs in their field (e.g., the building trades), but that low wage workers (like hospital workers) have little or no power to protect their economic interests.[4]

At the theoretical level, Hamermesh has constructed a simulation model of the displacement effects related to the Manpower Development Training Act, on-the-job training, and institutional training of the disadvantaged.[5] In the derivation of the model, disruption effects are mentioned. The model itself, however, does not explicitly treat the disruptive effects. Hamermesh assumes a fixed level of output and a firm subsidy based on a level required to get a set number of disadvantaged hired as trainees (not based on disadvantaged personnel training potential attributes), and allows for substitution between capital, subsidized and nonsubsidized employees, and training. From his model, Hamermesh concludes:

. . . only the quit rate appears to have any effect on the percentage displacement caused by the training subsidies. . . . unless the occupations in which the subsidies are provided are ones in which shortages exist, policy makers face a fundamental trade-off between job creation for disadvantaged workers and the displacement of subsidized workers.[6]

Hamermesh's policy prescription is that "subsidies might be concentrated

[3] Glen Cain and Robinson Hollister, "The Methodology of Evaluating Social Action Programs," *Discussion Papers* (Institute for Research on Poverty, University of Wisconsin, 1969), 33-34. The quote also appears in "Evaluating Manpower Programs for the Disadvantaged," in *Cost-Benefit Analysis of Manpower Policies*, ed. by Gerald G. Somers and W. D. Wood (Kingston, Ontario: Industrial Relations Centre, 1969), 141-142.

[4] Ibid., Cain and Hollister, 34, or in Somers and Wood, 141.

[5] Daniel S. Hamermesh, "Jobs for Disadvantaged Workers and the Displacement Problem," *Economic Aspects of Manpower Training Programs* (Lexington, Mass.: Heath Lexington Books, 1971), Ch. 2, 11-42. For a shorter version see Daniel S. Hamermesh, "The Secondary Effects of Manpower Programs," in *Evaluating the Impact of Manpower Programs*, ed. by Michael E. Borus (Lexington, Mass.: Lexington Books, 1972), 231-244.

[6] Ibid., 36.

in manufacturing and some service industries rather than in other sectors if such a concentration is politically feasible."[7] He also advocates limiting subsidies in times of high unemployment to avoid displacement.

In his 1972 article, Hamermesh suggests:

In general, upgrading would be concentrated on training low skilled workers for more highly skilled jobs in which shortages exist. Such a strategy would, thus, avoid the displacement likely to arise from training currently unemployed workers for entry-level vacancies.[8]

Hamermesh's models and policy suggestions have been severely criticized. Comments by Cain and Thurow in the Borus volume[9] attack the assumptions of the model, the absence of actual empirical testing, and the practicality of the policy prescriptions. Cain gets off a second volley in the most recent issue of the *Industrial and Labor Relations Review*.[10]

The theory of negative effects developed in the present paper suggests that the Hamermesh policy prescriptions may generate large negative effects. Thurow covers one aspect of the negative effects associated with the training of low skilled workers for high skilled jobs as follows:

I suspect that this categorical imperative runs against the grain of any internal labor market. The employee teamwork . . . would be nonexistent. Even more importantly, the informal on-the-job training that takes place among employees would vanish as new workers were jumped over old workers.[11]

The internal labor market disruptive effects would likely be even more important if training were to be concentrated in the rapidly unionizing government services sector and the highly organized manufacturing sector. These considerations will be discussed further in the policy prescriptions section.

On the empirical side, perhaps the most extensive and sophisticated analysis to date of Manpower Development Training Act training, Hardin and Borus' *Economic Benefits and Costs of Retraining Courses in Michigan*, treated training, trainee, and the state of the external labor market in depth.[12] The natures of the regular work force and the internal labor market, however, were *not* covered by the Hardin-Borus analysis. Recently the

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7 Ibid., 38.

8 Borus, op. cit., 237.

9 Glen G. Cain, "Secondary Labor Market Effects of Manpower Programs," in Borus, op. cit., 245-51, and Lester C. Thurow, "Secondary Labor Market Effects of Manpower Programs: Comment," in Borus, op. cit., 253-56.

10 Glen G. Cain, book review of *Economic Aspects of Manpower Training Programs* by Daniel S. Hamermesh, *Industrial and Labor Relations Review*, 26:3 (April, 1973), 1038-40.

11 Thurow, op. cit., 254.

12 Einar Hardin and Michael Borus, *Economic Benefits and Costs of Retraining Courses in Michigan* (Ann Arbor: School of Labor and Industrial Relations, Michigan State University, December, 1969).

Manpower Administration has begun to study trade union attitudes toward occupational upgrading programs and internal mobility paths in the internal labor market. As yet it has not put the two together in a study, to my knowledge.[13]

To end this brief review of earlier studies, we cite Borus and Buntz on the treatment of secondary effects in the evaluation of manpower programs as follows:

The problem is that at present there is no theoretical basis for determining who, other than program participants, will be affected by manpower programs. Nor has any operational methodology been developed to measure secondary effects.[14]

The purpose of the present paper is to suggest a preliminary model for the evaluation of the disruptive effects of occupational upgrading programs on occupational mobility patterns in a trade union environment.

The Model

Utilizing the Doeringer and Piore construction, an internal labor market is an "administrative unit, such as a manufacturing plant, within which the pricing and allocation of labor is governed by a set of administrative rules and procedures."[15] The market is generated by skill specificity which makes occupational progression by on-the-job training efficient. Past practice and precedent give rise to a set of rules of the shop termed "customary law." Customary law is fostered by stability and homogeneity in the work force. It is partially codified in collective bargaining agreements, in company or governmental personnel policies, and in the relevant grievance arbitration awards.

Such a market has value to employees in the form of reduction in the uncertainty of a future income stream (job security) and in job equity through a system of industrial jurisprudence. Employers benefit from such a structure due to cost reductions associated with reduced turnover and technical efficiencies in recruiting, screening, and training.

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[13] For trade union attitudes, see John Clarke, *Upward Mobility for the Underemployed Worker* (Humanic Designs Corporation, June 11, 1971). See also Arthur W. Kirsch and Donald D. Cooke, *Upgrading the Work Force: Problems and Possibilities* (E. F. Shelley and Company, January, 1971). On internal mobility patterns, the Manpower Administration has given grants on "Development of Upgrade Models in Private Industry" and "In-Plant Upgrading and Mobility Patterns." Abstracts of these appear on pages 35 and 36 of *Manpower Research and Development Projects,* 1972 Edition, Manpower Administration, U.S. Department of Labor. *Neither mentions the role of trade unionism.*

[14] Michael E. Borus and Charles G. Buntz, "Problems and Issues in the Evaluation of Manpower Programs," *Industrial and Labor Relations Review,* 25:2 (January, 1972), 243.

[15] Doeringer and Piore, op. cit., 1-2.

In this model, "The local union becomes a vehicle for the expression and enforcement of customary law."[16] The results of the union presence include "raising the cost to management of changing customary procedures, . . . codification of unwritten custom into collective bargaining agreement," and the provision of "an organized channel for deliberate change in customary practices through collective bargaining."[17]

The internal labor market is composed of a group of more or less closed mobility clusters consisting of an entry port(s), a progression of job classifications linked by related skills or common function, and an exit port(s).

Internal mobility depends largely upon ability, seniority, and merit operating through layoff and promotion clauses. The following source highlights the importance of this last premise.

Most employers appear to have adjusted to seniority as *the* criterion governing the ordering of layoffs and recalls, particularly if they have secured contract language giving assurance that they will have qualified personnel manning the available jobs at all times.[18]

Study of promotion clauses in contracts covering 1,000 or more workers indicates a wide variety of promotion systems. The provisions vary in prevalence and content according to the relative weight placed on seniority and ability factors. Excerpts from several clauses provide some illustrations of the variety.

Ninety percent of the manufacturing agreements included promotion clauses, compared with 43 percent in nonmanufacturing.[19]
Of 1,201 agreements containing promotion details, 93 percent (1,112), covering 95 percent of the workers, indicated that seniority would be considered in making promotions. . . , but more often than not in combination with other factors, such as skill, merit, aptitude. . . .[20]

Nine-tenths of the agreements having promotion provisions, covering the same proportion of workers, stipulated factors in addition to seniority would be considered. . . . The nonseniority factors most frequently encountered—skill and ability—occurred in about three-fourths of the agreements.[21]

Regardless of the form, "One can find a broad consensus on the values of promotion from within as a general rule."[22]

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16 Ibid., 35.

17 Ibid., 35-36.

18 Harold W. Davey, *Contemporary Collective Bargaining*, 3rd. ed. (Englewood Cliffs, New Jersey: Prentice-Hall, 1972), 231-32.

19 Winston L. Tillery and William V. Deutermann, Jr., *Seniority in Promotion and Transfer Provisions*, Bureau of Labor Statistics Bulletin No. 1425-11 (Washington, D.C.: U.S. Government Printing Office, March, 1970), 3.

20 Ibid., 5.

21 Ibid., 7.

22 Davey, op. cit., 233.

Given the mobility cluster and the institutionalized rules for mobility, the model becomes an intertemporal one. The employer sizes up prospective employees and hires on the basis of expected benefit (output) and cost (recruiting, screening, and training) streams. The internal labor market also provides the employee, once on the job, with an expected future income stream deriving from the wage rates attached to the jobs in the mobility cluster and the expected length of tenure on each job before further promotion.

$$[1] \quad Y_E = \sum_{t=0}^{h} \frac{Y_t}{(1+r)^t},$$

where

Y_E = present discounted value of the expected income stream;

Y_t = expected income at time t;

r = discount rate;

and the income expectations stretch from the present $(t = 0)$ through to the horizon $(t = h)$, at which time the employee quits, retires, or otherwise terminates employment with the employer.

The income in any time period depends upon the wage rate (W_{jt}) and time on the job (N_{jt}) for each job held in that time period:

$$[2] \quad Y_t = \sum_{j=0}^{e} W_{jt} N_{jt}$$

where j indicates the job held in the cluster and includes all jobs from the entry level $(j = 0)$ through the exit job $(j = e)$.

By substitution into [1],

$$[3] \quad Y_E = \sum_{t=0}^{h} \sum_{j=0}^{e} \frac{W_{jt} N_{jt}}{(1+r)^t}$$

The wage rate for any occupation depends mainly upon the type of job. In a rate range system, it will often depend partly upon tenure on the job (in progression from the bottom of a rate range to the midpoint) and partly upon merit (in progression from the midpoint to the maximum). On incentive pay jobs, the wage rate is a function of the guaranteed base rate and output. In some cases, it can also be a function of the work group, directly (group incentive), or indirectly (efficiency of those lower in the production chain feeding their output into those higher in the chain). Merit determinations may be affected by group behavior and morale as well. Thus, assuming a linear approximation:

$$[4] \quad W_{jt} = W_{j0} + W_{j1} T_j + W_{j2} M_j + W_{j3} Q_j + W_{j4} G,$$

where

W_{j0} = the rate range minimum or incentive base rate, where applicable, for job j;

$W_{j1}T_j$ = the wage increment for tenure (T) in job j, where applicable;

$W_{j2}M_j$ = the wage increment for merit (M) in job j, where applicable;

$W_{j3}Q_j$ = the wage increment for incentive payments for output over the base rate, where applicable;

$W_{j4}G$ = the wage increment or decrement due to direct or indirect effects of the group (G) on output and/or merit and/or morale.

The time spent in any job in the cluster depends upon the promotability of the employee and the opportunity for promotion. The Bureau of Labor Statistics study cited above points out the importance of seniority (S_t) and ability (A_t) in advancement. The opportunity to advance depends directly upon the frequency of vacancies in jobs above the one held in the cluster. This frequency is determined largely by aggregate demand (D_t) and retirement (R_t). Advancement also depends upon the vacancies below the current job held in the cluster and upon the persons in jobs lower in the cluster (cluster variable C_t). Promotion might be held up while the employee finishes training those lower in the cluster. Such instruction might include on-the-job training for persons for jobs they already fill, training new trainees in jobs to be filled, or training a replacement for oneself.

Therefore, again assuming linearity,

[5] $N_{jt} = N_1 S_t + N_2 A_t + N_3 D_t + N_4 R_t + N_5 C_t$.

Finally, there is a probability which attaches to any income at time t depending upon whether the worker will be on the job or laid off. As noted by Davey above, the primary determinant of layoff ordering is seniority.

Therefore,

[6] $P_t = P_t(S_t)$,

where P_t is the probability of being at work at time t.

Making the proper substitutions in [3], the expected future income stream is

$$Y_E = \sum_{t=0}^{h} P_t(S_t) \sum_{j=0}^{c} \frac{(W_{j0} + W_{j1}T_j + W_{j2}M_j + W_{j3}Q_j + W_{j4}G)(N_1 S_t + N_2 A_t + N_3 D_t + N_4 R_t + N_5 C_t)}{(1+r)^t} .$$

Impact of Manpower Programs

The success of occupational upgrading programs viewed in this context depends upon the extent to which the programs place and advance trainees without changing the income distribution expected by the current work force. Undisturbed by manpower programs, progression within the mobility clusters develops according to customary law, both codified and informal. Entrants start at the bottom and work their way through the cluster. The impact of the manpower program will depend upon the type of program.

Let us examine two types of programs: on-the-job training and institutional training.

On-the-job training places a trainee on the job to learn skills he would not otherwise be hired to learn. Theoretically the trainee would not normally be hired because the employer considers the trainee's wage, recruiting, screening, and training costs to outweigh the value of his output stream. A subsidy is extended to the employers to reimburse him for the extra costs of hiring the disadvantaged trainee.

As noted earlier, Cain and Hollister have pointed out that the costs of these programs are probably understated. Output of the regular work force is reduced not only because of the opportunity cost of the foregone output of the instructor, but also due to the output loss of disgruntled regular workers. The negative effects of on-the-job training programs suggested by Cain and Hollister include both equity and income effects. Both can be shown to be manifest in the effective expected income stream constructed above.

The first effect is an equity effect. After the fashion of Becker's discrimination analysis, favoritism as well as discrimination decreases the effective income of the regular work force. Management toleration of trainee absenteeism, tardiness, and insubordination that would result in disciplinary action and possibly discharge for regular employees sets a double standard.

Although numerous "popular" reports of this dual standards problem could be cited, one scientific study of this phenomenon can be mentioned appropriately here. Forty-nine hardcore unemployed black males were placed in a predominantly white utility company. Managers were requested to "go easy, but not too easy" on the trainees. A subjective expected utility (SEU) index which weighs the utility of program effects by the probability of their occurrence was derived for management, foremen, the rank and file, and the union. Changes in SEU scores between pre- and post-program measurements indicated:

For the company as a whole there was a drop in overall SEU score, caused by an increase in negative attitude base. . . . Both foremen and rank and file worker shifted negatively in overall SEU, the shift being due to both a decrease in positive scores and an increase in negative scores. The union showed decreases on both positive and negative SEU scores, with the overall SEU score remaining unchanged.[23]

It should be noted that the union's initial negative score was 33% more negative than the next highest score.

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[23] Jhalmar Rosen, *Work Adjustment of the Hard-Core Unemployed*, Final Report to the Manpower Administration, 1969, 100-101.

Double standards, of course, violate the basic tenet of industrial jurisprudence, "that . . . policies and procedures governing on-the-job relationships . . . apply to all workers covered by the contract in like fashion in like circumstances."[24]

Favoritism coupled with discrimination enters the effective income formulation as an "equity" coefficient d: $Y_t = Y_At (1+d)$, where d is negative. Working with management favorites who are "different" in terms of behavior and/or race decreases the utility and status of the actual paid income, i.e., decreases the "effective" income stream.

There are many potential direct income effects. These come about through reduced output, changes in relative seniority, and/or changes in promotability.

Output (Q_t) may be reduced because of a number of effects after the introduction of on-the-job training. These effects are more important where wages are a function of output, such as under individual or group incentive pay plans. Here output declines may be occasioned by on-the-job training disruptions lower or higher in the production process.

Where workers higher up in the production process must use the output of trainees lower in the chain, output declines for regular employees may be caused by inferior trainee output (craftsmanship) and lower than normal output (less input for regular pieceworkers). Both of these effects will extend over longer periods of training time for disadvantaged compared to regular trainees.[25] Morale (G) problems may diminish individual and group effort in both incentive and nonincentive jobs. In incentive work, this has a direct wage impact. In nonincentive work, it may have a long-run impact via the promotability of employees in the eyes of management.

Finally, to the extent that the market forces operate, increasing the supply of workers will have some negative wage effects in terms of reduced negotiated wage increases (W_{ji}) and the cutting of overtime hours (N_{jt}).

Although on-the-job training programs do not usually involve seniority changes to the detriment of the established work force in the form of reduced seniority, there may be "dilution" of seniority in several ways. There may be fear that favoritism toward on-the-job trainees will be expanded to seniority (S_t) in considering layoffs and promotions. Such a situation is particularly true where seniority systems have been discriminatory in the past. Actual changes in the job security of senior employees have been court-ordered since the Supreme Court decision in Griggs vs. Duke Power Com

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24 Davey, op. cit., 6-7. For further comments on the discipline problems of double standards and their treatment in grievance arbitration, see pages 222-27.

25 For example, the author once worked in a factory where the output of "slat stringers" on incentive pay could be slowed down considerably if punch press operators cutting slats cut slightly the wrong size. Slat stringers were forced to take the hourly rate when slats could not be cut quickly enough to keep up with the stringers.

pany.[26] Plant-wide seniority, coupled with upgrading programs, involves a direct diminution of the seniority rights of the regular work force. Affirmative action programs may have similar effects.

Promotability (P_t) and seniority (S_t) are inextricably tied together. The extensive role of seniority as a primary, if not sole, factor in promotability has been established above. The diminution of seniority rights directly decreases the promotability of the established work force and lengthens the time spent by some employees at lower wage jobs in the mobility cluster. Preferential promotion of the disadvantaged and/or minority members decreases the number of vacancies for which those higher in the mobility cluster can expect to compete effectively. This leapfrogging, whether actual or feared by regular employees, decreases the expected income stream of the work force.

Even when there is not fear of preferential promotion, the nature of occupational mobility through on-the-job training can decrease the promotability of some members of the mobility cluster. An established member of the work force may be held back from promotion to train slower-learning on-the-job trainees. Or he may be held back because on-the-job trainees are not ready to progress to fill the vacancy created if he leaves.

All these negative effects of on-the-job training programs suggest a decrease in effective expected future income to the established work force. Most of these apply to institutional training as well, although the magnitude of effects is probably smaller. Not all skill can be gained in the classroom. Some of it must be learned on the job. Other effects occur if the institutional training does not prepare the trainee as well as might be expected of a regular new recruit. Racial and demographic characteristics may also distinguish the new addition to the work group and give rise to equity effects.

Assume that regular employees are expected to be effective income maximizers, given the nature of the enterprise's internal labor market. Then recall that the local union not only becomes a vehicle for the expression and enforcement of customary law which raises the cost to management of changing customary procedures, but the local also provides an organized channel for deliberate change in customary practices through collective bargaining. Although the union may have organizational goals of its own, it must be responsive to membership's needs. Protection against decreases in the expected effective income of the membership is clearly one of these needs.

Hypotheses Generated Using the Model

A number of hypotheses concerning occupational upgrading in a collective bargaining environment are generated by the model.

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[26] Griggs vs. Duke Power Co., 401 U.S. 424 (1971).

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Initiation, implementation, and successful administration of occupa-
tional upgrading systems:

H1: Are facilitated by a nonunion environment.

Occupational upgrading programs for the disadvantaged affect the expected future effective income stream of the regularly employed labor force negatively. These reductions in income generate ill will. Employee dissatisfaction can best be expressed through the union whose rationale for existence is to serve the interests of its membership. Employee dissatisfaction is probably less in nonunion firms because customary law is less likely to be codified. Further, there is greater uncertainty concerning ability and seniority effects in layoffs and promotions. Finally, without a vehicle for effective expression, the dissatisfaction of the regular work force is muted.

H2: Require a negotiated approach in a union environment.

Unilateral imposition of occupational upgrading programs in a union environment must, under this model, put the union in a defensive position. Advance notice, consultation, and cooperation can reduce the expected income disturbances. Joint efforts could reduce the size of the equity coefficient (d) by dispelling fears of or limiting the inequities of favoritism in discipline and promotion. This mutual effort could be accomplished with a full explanation of the program (information) and/or by design under joint consultation to minimize negative effects.

H3: Are better received by the unions in rapidly expanding or rapidly declining industries.

Rapid expansion via aggregate demand increases creates more upward mobility in the firm through new jobs and allows overtime wage increases. The negative effects of training programs are more likely to be outweighed or at least reduced by short-run positive income effects through promotion and wage increases. Training programs in declining industries are more likely to be established for the regular work force. These programs increase income expectations of employees by training them to move to jobs not normally filled from within the cluster, or to jobs outside the industry as an alternative to unemployment.

H4: Are not affected by the vertical or horizontal dimensions of the mobility clusters in the internal labor market, but rather by the size regardless of distribution.

The fewer the income expectations which are affected and the smaller the decrease in individual expectations, the smaller will be regular work force dissatisfaction. Thus, the size of mobility clusters becomes important. Small clusters, regardless of vertical or horizontal dimensions, decrease the extent of income expectation changes. Further, the greater the extent to which promotions are based more on seniority as the primary determinant than upon other considerations, the smaller is the expectation disruption, because

trainees are less likely to be viewed as competitors for higher paying jobs. The greater the ability component in promotion, the greater is the uncertainty surrounding promotions and income streams and the greater is the fear of competition and favoritism.

> H5: Require application to all workers in a union environment, not just selected groups.

The extension of the availability of occupational upgrading programs to all persons in the plant decreases the favoritism effects. It can serve to increase the income expectations of the work force through improved future mobility and job security.

Discussion of the Hypotheses

> H1: Initiation, implementation, and successful administration of occupational upgrading systems are facilitated by a nonunion environment.

To the author's knowledge, no statistics have been published regarding the number of on-the-job training placements in union enterprise labor markets. An E. F. Shelley and Company study of a U.S. Department of Labor approved representative sample of 20 training programs in the U.S. indicated union presence in nine of the programs. This number is considerably more than might be expected if a sample were drawn based only upon the degree of unionization of the labor force. One program, Newark Industrial Training Services, providing upgrading services to 13 companies, "found that upgrading efforts were more easily established and were more successful in small, nonunion companies than in large, highly-unionized plants with rigid mobility structures."[27] In virtually all the sample program profiles involving unions, either the program was open to all employees or pressure was exerted by the union to open the program up.

The first hypothesis remains largely untested and open to debate.

A finding which affirmed the hypothesis would suggest an emphasis on training programs for nonunion environments. Such a prescription without more information on the impact of unions on upgrading is unwarranted. Certainly equity and legal considerations would argue against such an approach. Further, the theory does not suggest that there are negative effects only in a union environment. It only hypothesizes somewhat larger effects and more effective expression of them in a union environment.

> H2: Initiation, implementation, and successful administration of occupational upgrading systems require a negotiated approach in a union environment.

All but a few diehard management rights advocates would probably agree

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[27] E. F. Shelley and Company, Upgrading the Work Force (New York: E. F. Shelley and Company, 1971), 125.

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with the above hypothesis. One would suspect that training and retraining provisions have been extensively bargained for in the U.S., but such expectations are not well supported by available statistics. A BLS study of training and retraining provisions in major collective bargaining agreements effective in 1966, 1967, and later showed, "Fewer than 20 percent of the 1,823 major collective bargaining agreements studied contained training or retraining provisions. . . ."[28] This finding is undoubtedly an understatement of the true magnitude of provisions, since the study excluded apprenticeship provisions, short-term on-the-job learning, and informal agreements. The emphasis on manpower training in the intervening years has most certainly increased coverage greatly. Nonetheless, collective bargaining coverage is less than one might initially expect under the premise that joint determination is preferable.

The concentration of the bargained provisions lends support to the hypothesis, however.

Clauses were concentrated in six industries, each of which accounted for 20 provisions or more. These industries included transportation equipment; communications; machinery, except electrical; primary metals; utilities; and food.

Three unions in particular were parties to significant numbers of negotiated training and retraining provisions: The Steelworkers (47), Auto Workers (40), and the Brotherhood of Electrical Workers (27).[29]

In industries characterized by enterprise internal labor markets, unions and management have tended to codify training and retraining customary law.

Including unions in the preparation and implementation of upgrading programs increases the information flow about the program. Such information can decrease the equity loss (d) to the regular work force. Increased use of ongoing joint committees to monitor programs and foresee training problems is suggested by the analysis.

> *H3: Initiation, implementation, and successful administration of occupational upgrading systems are better received by the unions in rapidly expanding or rapidly declining industries.*

The Armour Automation Fund serves as a classic example of the latter phenomenon. Comments by union and management personnel regarding upgrading and the state of the business cycle suggest support for the hypothesis as well. A seminar for union and management representatives on upward mobility for the underemployed worker resulted in a finding that, "The participants specified that upgrading or other worker advancement ef-

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28 U.S. Department of Labor, Bureau of Labor Statistics, *Training and Retraining Provisions*, Bulletin No. 1425-7 (Washington, D.C.: U.S. Government Printing Office, 1969), 2.

29 *Ibid.*, 2.

forts would be impossible in a contracting national economy."[30] Jennings has also commented on occupational upgrading:

There is no sense kidding ourselves. If you engage in training and all you can guarantee is that the guy is going to be out collecting unemployment, your ability to motivate people becomes less and less a possible one. [The threat of ongoing unemployment] creates antagonism toward new guys coming in and . . . works against on-the-job training opportunities for new employees.[31]

The BLS study found that training clauses were concentrated in "industries which have experienced continual technological development . . . ."[32]

H4: Initiation, implementation, and administration of occupational upgrading systems are not affected by the vertical or horizontal dimensions of the mobility clusters in the internal labor market, but rather by the size regardless of distribution.

A survey of the literature and discussions with industrial engineers at Iowa State University indicates little work has been done on mobility patterns within firms by industry. Data does exist on the extent of seniority in provisions regarding training and promotion. Opinions of union leaders on eligibility for training are also available. Some representative examples follow:

Union representatives strictly adhered to the principles of trainee selection on the basis of seniority. First priority must be given to older union members.[33]

Other criteria for a Union supported program would include: 1) selection of trainees by seniority and other impartial methods (all of our training programs led to the conclusion that none of the ordinary factors, i.e., age, experience, education, etc., can predict success). . . .[34]

The most prevalent limitation on management's right to choose trainees, and also most sweeping, substituted seniority for employer discretion. From the traditional union viewpoint, seniority represented the fairest selection procedure, one designed to eliminate both errors in judgment and possible favoritism.[35]

The BLS study concerning determinants of promotion is also applicable. The quotations mentioned earlier establish the importance of seniority as a factor in promotion. Twenty-three percent of the workers covered by ma-

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[30] Humanic Designs Corporation, *Upward Mobility for the Underemployed Worker* (Manhasset, New York; Humanic Designs Corporation, 1971), iv.

[31] Statement by Paul Jennings, President of the International Union of Electrical, Radio and Machine Workers, AFL-CIO, ibid., 5.

[32] United States Department of Labor, op. cit., 2.

[33] Humanic Designs Coporation, op. cit., iv.

[34] Jerry Wurf, International President of the American Federation of State, County and Municipal Employees, AFL-CIO, statement before the House Subcommittee on Labor during hearings on the 1970 Amendments to the Fair Labor Standards Act, ibid., Appendix A, 6.

[35] United States Department of Labor, op. cit., 18.

jor collective bargaining agreements were under contracts with seniority as the primary determinant in promotion. Less than 5% were covered by contracts where seniority was not a factor.[36]

Training programs which encourage promotion based upon ability where customary law dictates promotion based on seniority will incur large negative effects. On the other hand, entry-level training programs providing for seniority promotion in industries with strong seniority-in-promotion clauses will cause smaller negative effects.

> H5: Initiation, implementation, and administration of occupational upgrading systems require application to all workers in a union environment, not just selected groups.

This hypothesis is supported to a large extent by material in hypothesis 4. Additional material highlights the problem as viewed by the union.

Another problem caused by well meaning "experts" occurs in the New Career program. There is "leapfrogging" over the long-term employees at entry-level by an outsider who has been trained for an upper level job from the ranks of the unemployed. Further, new Associate Degree programs from the junior colleges train people, usually young, ambitious, who come in just above the entry-level of skilled people who have been in the job for many years. When this is coupled with the lower level employee with long experience but no credentials who is performing at a higher level, the predicament of the dead-ended worker causes the Union to be less than happy with the training program. Only by creation of an upward mobility training program, which the Union can control by methods of seniority selection, can there be an equity of opportunity.[37]

Drotning and Lipsky conducted "fairly intensive" interviews with 36 union leaders in western New York having experience with on-the-job training programs and with 15 leaders who had never been involved with manpower training programs.

Union leaders generally opposed special treatment (accelerated promotion, exceptions to seniority, and lower work standards) for trainees. The overwhelming preference of trade union officials, both those who had worked with manpower programs and those who had not, was for promotion on the basis of seniority where merit is equal, and for equal work standards.[38]

Over half of the experienced union leaders felt that their members would support working with hardcore, disadvantaged black trainees. Less than a third of the inexperienced leaders answered affirmatively. Experienced leaders responded negatively when asked about membership support, indicating that, "A main concern was job security."[39] At times the possibility of

36 Tillery and Deutermann, op. cit., 37.

37 Jerry Wurf, op. cit., 9.

38 John Drotning and David B. Lipsky, "How Union Leaders View Job Training Program," Monthly Labor Review (April, 1971), 65.

39 Ibid., 65.

strong negative effects will cause employers to widen training programs to include their regular employees. Such was the case with minority upgrading projects run by Signal Oil in Houston and by the Transportation Opportunity Program in Los Angeles.[40]

One response to the negative effects flowing from dual standards has been a trend toward negotiation of new job descriptions, with lower pay and longer probationary periods, for trainees. This decreases the favoritism and negative equity effects in the eyes of regular employees.

In conclusion, results from studies of union and management attitudes, collective bargaining provisions, and manpower programs indicate the plausibility of utilizing the theory of the internal labor markets to analyze the negative effects of occupational upgrading systems in a union environment.

Variables important to the determination of negative effect magnitudes include:

The existence of unionization;
The importance of seniority in promotion and training;
The importance of other factors in promotion and training;
The size of the mobility cluster;
The skill level focus of the training program;
The rate of expansion of aggregate demand; and
The homogeneity of the trainees and work force.

Interestingly enough from the vantage point of the internal labor market, two of the policy prescriptions made by Hamermesh are exactly opposite to what one would suggest to minimize negative training effects. Concentrating subsidies in the highly unionized manufacturing sector and in the rapidly growing and rapidly unionizing government service industry is likely to create larger negative effects than concentration in nonunion industries. Similarly, concentrating training on moving low-skilled workers to more highly skilled shortage jobs rather than training currently unemployed workers for entry-level vacancies is a type of leapfrogging with large negative effects. Subsidizing training for workers higher in the mobility clusters to move to skill shortage occupations is suggested. Training the disadvantaged for entry-level jobs would be a concomitant policy prescription.

Research Suggestions

The model constructed above may be used in several ways to quantify negative effects. The magnitude of negative effects, and program designs to avoid or minimize negative effects, can be determined using unpublished data from manpower programs. One need only sample the literature on manpower programs to find numerous cost-benefit analyses of manpower

[40] E. F. Shelley and Company, op. cit., 140-43, 150-52.

programs. Most of these studies could have been modified to quantify negative effects for trainees. For instance, the encyclopedic Hardin and Borus study of retraining in Michigan formulated an equation using "Gain in Annual Earnings per Trainee" as the dependent variable, with 24 primary and interaction-effect independent variables.[41] Trade unionism as a variable could have entered the equation both as a primary effect and in interaction effects. It is plausible that the negative effects caused by placing the disadvantaged in a union environment could cause a relative decrease in the income of the trainee. Further, the regular work force may make it so unpleasant for trainees that they exit the program. Rosen conducted interviews with stayers and leavers in his study:

. . . relations with other workers seemed to be central to job satisfaction. Five of the stays and two of the leaves reported that co-workers were friendly and easy to get along with, while four of the leaves and two of the stays mentioned difficulties with fellow workers as a major shortcoming of the job.[42]

The magnitude and determinants of the extent of negative effects might be measured in a study designed solely for that purpose. A sample of union and nonunion firms with trainees and without trainees could be selected from the files of the Iowa Bureau of Employment Security. A sample of workers in the plants could be selected to provide data on demographic characteristics, earnings, and occupational mobility. Additional variables would include criteria for promotion, seniority, hiring frequency, turnover rates, overtime, and other variables related to the nature and state of the internal labor market.

A regression format with regular worker earnings serving as the dependent variable would count unions and training as primary and interaction effects among the independent variables. The coefficients would suggest magnitudes for negative effects. They would also point out important variables which could be manipulated in the design of training programs to minimize negative effects.

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41 Hardin and Borus, op. cit., 113-14.
42 Rosen, op. cit., 141.

ENTRY INTO THE BUILDING TRADES UNIONS: A COMPARISON OF APPRENTICESHIP AND OTHER ROUTES

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Abstract

Entry into unionized construction through apprenticeship programs, direct admission to journeyman status, transfers from other local unions, and working on temporary permit were studied for six basic trades in nine cities. Admissions policies were found to vary widely among crafts but were quite similar within given crafts. Interviews with union officials and journeymen revealed that admissions criteria varied with the degree of tightness of the labor market. Analysis of average hours worked during recent years by representative samples of journeymen indicate that, because of their broader training, journeymen trained in apprenticeships tended to work more than journeymen who had not had apprenticeship training. Also, apprenticeship-trained workers seemed to advance into supervisory positions more rapidly and in relatively greater numbers than did journeymen without apprenticeship training. Of the several traditional means of entry into the unions, apprenticeship seems to produce the most qualified craftsmen. However, each of the other routes has played an important role in permitting flexible supply adjustment to the characteristic instability of the construction labor market. Implications from the analysis are drawn for the contemporary issue of minority admission into building trades unions.

Although building trades unions function as the organizers, trainers, and suppliers of large numbers of tradesmen within the construction industry, little research has been devoted to the processes whereby men are taken into unions and the labor market. A casual observer might assume that most or all journeymen[1] are trained through formal apprentice-

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[1] In this paper, "journeyman" designates a person who obtains the full union wage rate. It will be used interchangeably with the terms "craftsman" and "mechanic," which are terms commonly used in the industry.

ship programs. However, recent studies[2] have shown that although the percentage of union members who were trained in apprenticeship varies by craft and by geographical area, on the whole more building tradesmen have been trained informally—in nonunion programs—than have learned their trade in formal apprenticeship programs.

How do these journeymen fare in the construction labor market as compared with journeymen who have come through the apprenticeship route? That is, do apprenticeship graduates experience more steady employment than nonapprenticeship graduates? Do apprenticeship graduates tend to advance to supervisory status faster and more often than nonapprenticeship graduates? Although several studies have provided follow-up information on the career patterns of apprenticeship graduates,[3] none have revealed how the experiences of these workers compare with those of other journeymen.

The purpose of this study has been to bridge this gap in understanding of construction unions in order to provide a more rational basis for public policy, especially regarding the issue of increased minority participation in the industry. The project was designed to investigate a cross section of trades in large and small cities and in a variety of geographic locations. Six basic trades were selected for the study: bricklayers (Bricklayers, Masons, and Plasterers' International Union), carpenters (United Brotherhood of Carpenters and Joiners of America), electrical workers (International Brotherhood of Electrical Workers), ironworkers, (International Association of Bridge, Structural, and Ornamental Ironworkers), plumbers and steamfitters (United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada), and sheet metal workers (Sheet Metal Workers International Association). Information was collected in nine cities: Atlanta; Austin, Texas; Columbus, Ohio; Chicago; Houston; Jackson, Mississippi; New York; Oakland; and San Francisco.

Traditional Entry Routes into Building Trades Unions

There are four traditional means by which a person can obtain work in the jurisdiction of most building trade local unions: he may join the union as an apprentice and, after receiving sufficient training, graduate into the

2 For example, see Howard G. Foster, "Nonapprenticeship Sources of Training in Construction," *Monthly Labor Review*, 93:2 (February, 1970), 21-26; Irwin Dubinsky, "Trade Union Discrimination in the Pittsburgh Construction Industry," *Urban Affairs Quarterly*, 6:3 (March, 1971), 297-318; and Herbert Hammerman, "Minority Workers in Construction Referral Unions," *Monthly Labor Review*, 95:5 (May, 1972), 17-26.

3 See Joseph H. Schuster, "Career Patterns of Former Apprentices," *Occupational Outlook Quarterly*, 3:2 (May, 1959), 13-19; California Division of Apprenticeship Standards, *Survey of Completed Apprentices Certified by the California Apprenticeship*

journeyman category; he may join the union as a journeyman or be upgraded into the union's construction branch from a lower skilled branch; a member may transfer into most local unions from other locals within the same international; and in some locals, a nonmember may work on temporary permits. (All locals allow members of other locals to work on temporary traveling cards when work is plentiful.)

These means serve various ends: apprenticeship—which trains the nucleus of all-around mechanics (and increasingly, supervisors); direct admission of journeymen—the expedient by which the unions organize open shops or take in skilled individuals who could compete with union members for work; open-transfer policies—which allow mobility in the construction labor market; and the permit system, allowing unions to expand and contract their labor forces without increasing their permanent membership.

Interviews with union officials and members in the cities studied revealed that policies concerning admissions and permits vary widely from city to city and among the locals within each city. However, certain patterns are discernible.

First, in general, policies of various locals of a given international union resembled each other much more than did the policies of all locals within a given city. That is, admission policies for plumbers in Columbus showed more similarity to admission requirements for plumbers in Chicago or Atlanta than for bricklayers in Columbus. Second, admission requirements in general were most stringent for electrical work, followed in order by plumbing, sheet metal work, ironwork, carpentry, and bricklaying. Third, there was greater similarity found among apprenticeship standards than among journeyman admission policies. Fourth, admission policies—particularly those regarding the granting of permits and transfers and those regarding direct journeyman admission—seemed to vary with the tightness of the labor market. Finally, admission requirements for apprentices also tended to be stricter than those for incoming "direct admission" journeymen. Many locals examined prospective journeymen for proficiency in specialty fields, whereas apprentices had to pass comprehensive examinations. As a result, apprenticeship graduates tended to be more widely trained than members who joined as journeymen.

The Superiority of Apprenticeship as an Entry Route

The supposition that apprenticeship-trained craftsmen are superior to journeymen trained in other ways is based on the following logic. First, an

Council in 1955 (San Francisco: Division of Apprenticeship Standards, California Department of Industrial Relations, 1960); and Sara Behman, "Survey of Former Carpenter Apprentices Registered in the Bay Counties Carpenters Apprenticeship and Training Program" (Berkeley: Institute of Industrial Relations, 1969).

apprenticeship-trained craftsman is a better skilled craftsman because he is a broadly trained mechanic. During apprenticeship, he has been exposed to all parts of his craft (or at least to more aspects than he was likely to learn on his own). Second, he can adapt to different job situations and changing conditions because he knows the theory underlying his work, for his apprenticeship provided him with not only on-the-job training but also with related classroom instruction. He is more productive because of this knowledge and because experienced journeymen have taught him to apply his knowledge on the job. Third, since the apprenticeship-trained craftsman is broadly trained and knows all parts of his trade, including blueprint reading and job layout, he is more likely to advance to supervisory positions than are other journeymen.

Although logic suggests that apprenticeship provides the best available training in construction, few empirical data are available to support this claim. Perhaps one of the strongest pieces of existing available evidence is performance on occupational licensing tests. Scores on one such highly regarded test, the Texas state journeyman plumbing examination,[4] show that apprenticeship-trained examinees outperform others (see Table 1). Insofar as the test measures skill at the trade, the results show that apprenticeship-trained journeymen have a definite skill advantage over nonapprenticeship-trained journeymen. But if test scores measure only ability to take the test, then apprenticeship might be good preparation only for test taking. Thus, although these test results strongly indicate that apprenticeship training produces craftsmen with superior skills, they are not conclusive.

In view of the weaknesses of using skills tests to show the superiority of apprenticeship, we have attempted to measure more objectively the relative worth of apprenticeship and nonapprenticeship training in construction, utilizing two new approaches. One was to determine whether apprenticeship graduates are found in disproportionately high numbers in supervisory positions. The results of this method are examined later in this paper.

The other approach was to compare the number of hours worked annually by a random sample of journeymen from each local union studied. This method is based on the premise that, compared with journeymen with less training, more skilled and more productive workers are in greater demand and will therefore tend to suffer less unemployment. Also, broadly trained craftsmen are likely to remain employed more steadily because they can better adapt to changes in market demand.

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4 This unusually well-designed and well-administered test is described in detail and praised in Benjamin Shimberg, Barbara F. Esser, and Daniel H. Kruger, "Occupational Licensing and Public Policy" (Princeton, New Jersey: Educational Testing Service, 1972), 149-151.

Table 1

PERFORMANCE OF APPLICANTS TAKING THE TEXAS STATE EXAMINATION FOR JOURNEYMAN PLUMBING LICENSE, NOVEMBER 1, 1963, THROUGH OCTOBER 31, 1964, BY TRAINING BACKGROUND

Analysis of all applicants

Training Background	Average Years Experience at the Trade	Number Examined	Number and Percentage Passed	Average Score
Apprenticeship-trained[a]	5.0 years	46	46 (100%)	86.4
Nonapprenticeship-trained	5.7 years	758	574 (75.7%)	70.7
Total		804	620 (77.1%)	71.8

Analysis of examinees with passing scores

Training Background	Average Years Experience at the Trade	Number Passed	Average Score
Apprenticeship-trained[a]	5.0 years	46	86.4
Nonapprenticeship-trained	6.1 years	574	80.8
Total		620	81.1

[a] Refers to training in registered apprenticeship programs only.
Source: Texas State Board of Plumbing Examiners.

Comparison of Average Hours Worked by Journeymen

In construction, more than any other industry, regularity of employment serves both as an indicator of the worker's attractiveness to employers and as a good proxy for his earnings. This is largely because of the casual and unstable relationship between workers and employers and because all journeymen receive the same wage rate. There is no wage hierarchy such as exists in other industries. A less skilled worker in another industry might work just as regularly as his better skilled counterpart but at a reduced rate. In construction, the less skilled individual works at the same rate but for fewer hours than his better skilled counterpart. Stated another way, the rewards for good work in the building trades are steady employment (considered in this section) and/or promotion (considered in a later section).

The claim that apprenticeship graduates tend to work more steadily than other journeymen was tested by taking samples of journeymen's names and the hours they worked from each cooperating union's pension or health and welfare fund eligibility list.[5] The samples included data for

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[5] Contributions to these funds are made by contractors on the basis of a negotiated number of cents per hour worked by each man. Thus it is possible to state with reasonable accuracy the number of hours worked by each man for union contractors. Some men, of course, may work in open shops (usually for less money); such work does not appear in the data presented here.

several years from the unions in Houston, Columbus, San Francisco, Oakland, and Chicago; in each of the other cities it proved feasible to retrieve data for only one year. When the names of traveling members of other locals or nonmembers working on temporary permits appeared, they were deleted from the samples, since it was impossible to determine how long those individuals desired to work in the area in any given year. For the same reason, members who could be identified as having joined the union or retired during a given year were excluded from the sample for that year, as were inactive members or persons who had died.

The names of men currently serving apprenticeships were also deleted because many were indentured late in the sample year and thus could not be counted for the entire year. Moreover, the number of hours worked by apprentices is often more a function of the efficiency of the program and the contractor's willingness to employ apprentices than an indicator of the apprentice's skill on the job.

Finally, the names of paid union officials were deleted. The names remaining in the samples, then, were those of active journeyman members of the unions being studied. The lists of names and hours worked were checked with apprenticeship coordinators and with records kept by the Bureau of Apprenticeship and Training and state apprenticeship agencies to determine which journeymen had completed registered apprenticeship programs.

Sampling Procedures

The samples analyzed in this paper ranged from only 1% of the active membership of the Bricklayers Executive Committee in New York (whose officials would allow only a minuscule sampling) to over 20% of the membership of some smaller locals. An attempt was made to obtain at least 10% samples of all but the largest unions, although after the names of travelers, apprentices, retired members, and union officials were deleted, some samples were less than 10% of the total membership.

Samples were extracted in two ways. One method was to select a name arbitrarily from the pension fund lists, on which names are kept either alphabetically or by social security number, by taking every fifth or tenth name until the desired sample size was reached. The other was to select a name arbitrarily and to take the nine names that followed, then skip several pages and select another block of 10 names, and so on, until the desired number of names was obtained. When used on an alphabetical list of names, the latter method often revealed several persons related to each other. This was an advantage in light of our intention to learn how workers actually get into construction unions.

There was only one significant departure from these procedures. While requesting a sample from the Carpenters District Council in Chicago, the

authors were mistakenly informed that the Council had had a registered program for only the last six years[6] and that the number of graduates would be so small relative to the total membership that any sample selected would probably be underrepresentative of the apprenticeship graduates. Therefore a list of half of the workers who joined the Council's local unions in 1970 was obtained, thereby assuring the presence in the sample of a representative number of apprenticeship graduates.

Results of Comparisons of Average Hours Worked

The sampling was performed as carefully as "real world" circumstances allowed. There are, of course, many methodological difficulties and problems of interpretation of the data.[7] As in the current literature on returns to investment in human capital, there is the problem of factoring out the impact of education and training from numerous other influences—such as native ability, family status, or peer influences—which may affect income and employment. These and other problems dealing with gathering and interpreting the data are discussed later in this paper.

The results of the comparisons of average hours worked by the sample of apprenticeship-trained and other journeymen are summarized by international union in Tables 2 through 7. The data in these tables are not as complete as could be desired because of lack of cooperation by certain local unions and district councils. Neither are the figures comparable between trades or cities, due to differing labor market conditions and referral procedures. Nevertheless, the summarized data are emphatic in their support of the hypothesis that journeymen with apprenticeship training, because of their broader skills, will tend to work more than journeymen without apprenticeship training, who are more likely to be narrowly skilled specialists.

In 32 of the 41 local unions and district councils for which data were available, apprenticeship-trained journeymen worked consistently and significantly more than journeymen trained in other ways. By contrast, in only three locals did apprenticeship-trained journeymen work less than journeymen without apprenticeship training (and in only one case was this true

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[6] As it turned out, the program had been registered for many years, but the sample had already been taken when that fact was discovered.

[7] For an introduction to the problems and difficulties of this type of research, see Garth L. Mangum, "Evaluating Federal Manpower Programs," *Proceedings of the Twentieth Annual Winter Meeting of the Industrial Relations Research Association,* Washington, D.C., December 28-29, 1967 (Madison, Wisconsin: Industrial Relations Research Association, 1968), 161-171; and Glen C. Cain and Robinson G. Hollister, "The Methodology of Evaluating Social Action Programs," in Arnold R. Weber (ed.), *Public-Private Manpower Policies* (Madison, Wisconsin: Industrial Relations Research Association, 1969), 5-34.

Table 2

COMPARISON OF AVERAGE HOURS WORKED BY
APPRENTICESHIP-TRAINED JOURNEYMEN AND JOURNEYMEN
NOT TRAINED IN APPRENTICESHIPS, BY YEAR: BRICKLAYERS UNIONS

Unions (and years) studied) (1)	Journeymen in Sample (Percent of active membership) (2)	Apprenticeship Graduates (percent of sample) (3)	Average Hours Worked by:		Percentage Differential [(4-5)/5] (6)
			Apprenticeship Graduates (4)	Journeymen Not Trained in Apprenticeship (5)	
Atlanta (Local 8)					
1970	76 (8%)	20 (26%)	1,047a	993a	5.4%
New York (Executive Committee)					
1970	64 (1%)	21 (33%)	1,010b	1,039b	− 2.8%
Chicago (Local 21)					
1971	267 (5%)	99 (37%)	1,411	1,215	16.1%
1970	284 (6%)	104 (37%)	1,394	1,272	9.6%
1969	295 (6%)	110 (37%)	1,639	1,536	6.7%
1968	294 (6%)	110 (37%)	1,605	1,520	5.6%
Columbus (Local 55)					
1971-72	115 (21%)	30 (26%)	1,851	1,248	48.3%
1970-71	111 (21%)	28 (25%)	1,273	1,006	26.5%
1969-70	101 (19%)	28 (28%)	1,343	937.3	42.3%
Oakland (Local 8)					
1971-72	64 (16%)	15 (23%)	1,233	1,112	11.0%
1970-71	63 (15%)	16 (25%)	1,097	1,112	− 1.4%
1969-70	58 (14%)	14 (24%)	1,274	1,230	3.6%
1968-69	58 (14%)	13 (22%)	1,183	1,095	8.0%
1967-68	57 (14%)	12 (21%)	1,018	1,055	− 3.7%
1966-67	57 (14%)	10 (18%)	904	896	0.9%
1965-66	55 (13%)	9 (16%)	1,314	1,248	5.3%
1964-65	52 (13%)	9 (17%)	991	939	5.5%
San Francisco (Local 7)					
1971	119 (30%)	18 (15%)	1,217	1,105	10.1%
1970	119 (30%)	19 (16%)	1,211	1,221	− 0.8%
1969	116 (29%)	19 (16%)	1,051	1,236	−17.6%
1968	106 (27%)	17 (16%)	643	571	12.6%

a Strike during summer reduced hours for everybody.
b Work was scarce.

Table 3

COMPARISON OF AVERAGE HOURS WORKED BY
APPRENTICESHIP-TRAINED JOURNEYMEN AND JOURNEYMEN
NOT TRAINED IN APPRENTICESHIPS, BY YEAR: CARPENTERS UNIONS

| Unions (and years) studied) (1) | Journeymen in Sample (Percent of active membership) (2) | Apprenticeship Graduates (percent of sample) (3) | Average Hours Worked by: | | Percentage Differential [(4-5)/5] (6) |
			Apprenticeship Graduates (4)	Journeymen Not Trained in Apprenticeship (5)	
Atlanta (Local 225)					
1970	154 (6%)	14 (9%)	1,389	1,281	8.4%
Austin (Local 1266)					
1971	53 (7%)	12 (23%)	825a	738a	11.8%
Houston (District Council)					
1971	271 (4%)	53 (20%)	1,573	1,262	24.6%
1970	236 (4%)	44 (19%)	1,771	1,532	15.6%
Columbus (Local 200)					
1971-72	185 (10%)	40 (22%)	1,542	1,383	11.5%
1970-71	197 (11%)	38 (19%)	1,540	1,320	16.7%
1969-70	195 (11%)	37 (19%)	1,549	1,460	6.1%
Jackson (Local 1471)					
1971	94 (19%)	21 (22%)	1,474.1	1,148.1	28.4%
Chicago (District Council)					
1971	749 (2%)	46 (6%)	1,561	1,364	14.4%
1970	704 (2%)	46 (7%)	1,588	1,392	14.1%
Bay Area (District Council) (San Francisco and Oakland)					
1971	406 (5%)	104 (26%)	1,450	1,256	15.4%
1970	360 (5%)	97 (27%)	1,484	1,285	15.5%
1969	359 (5%)	99 (28%)	1,558	1,371	13.6%
1968	327 (5%)	87 (27%)	1,545	1,460	5.8%
1967	310 (5%)	80 (26%)	1,513	1,332	13.6%
1966	300 (5%)	79 (26%)	1,519	1,382	9.9%
1965	295 (5%)	74 (25%)	1,652	1,443	14.5%
1964	289 (5%)	74 (26%)	1,690	1,444	17.0%
1963	267 (5%)	68 (25%)	1,557	1,485	4.8%
1962	244 (5%)	60 (25%)	1,602	1,365	17.3%
1961	214 (5%)	55 (26%)	1,702	1,514	12.4%

1960	208 (5%)	51 (25%)	1,668	1,490	12.0%
1959	198 (5%)	51 (26%)	1,684	1,541	9.3%
1958	176 (5%)	49 (28%)	1,616	1,526	5.9%
1957	167 (5%)	47 (28%)	1,582	1,406	12.5%
1956	169 (5%)	46 (27%)	1,639	1,508	8.7%
1955	162 (5%)	41 (25%)	1,716	1,457	17.8%
1954	139 (5%)	36 (26%)	1,523	1,432	6.3%
1953	119 (5%)	28 (24%)	1,550	1,296	19.6%

a January-July 1971 only; no other data available.

Table 4

COMPARISON OF AVERAGE HOURS WORKED BY APPRENTICESHIP-TRAINED JOURNEYMEN AND JOURNEYMEN NOT TRAINED IN APPRENTICESHIPS, BY YEAR: INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS UNIONS

| Unions (and years) studied) (1) | Journeymen in Sample (Percent of active membership) (2) | Apprenticeship Graduates (percent of sample) (3) | Average Hours Worked by: | | Percentage Differential [(4-5)/5] (6) |
			Apprenticeship Graduates (4)	Journeymen Not Trained in Apprenticeship (5)	
Atlanta (Local 613)					
1970	78 (8%)	25 (32%)	2,121	1,338	58.5%
Houston (Local 716)					
1971	107 (8%)	33 (31%)	1,775	1,334	33.1%
1970	107 (8%)	33 (31%)	1,867	1,589	17.5%
Columbus (Local 683)					
1970-71	104 (12%)	53 (51%)	1,829.4	1,716.5	6.6%
1969-70	101 (12%)	47 (47%)	2,107.1	1,825.2	15.4%
1968-69	86 (10%)	37 (43%)	2,263.8	1,947.9	16.2%
Jackson (Local 480)					
1971-72	72 (31%)	37 (51%)	1,277	1,288	− 1.0%
Oakland (Local 595)					
1970	227 (23%)	125 (55%)	1,662	1,532	8.5%
1969	184 (19%)	95 (52%)	1,717	1,678	2.3%
1968	173 (18%)	89 (51%)	1,718	1,608	6.8%
1967	164 (17%)	84 (51%)	1,593	1,466	8.7%
1966	156 (16%)	79 (51%)	1,762	1,654	6.5%
1965	146 (15%)	67 (46%)	1,735	1,578	9.9%
San Francisco (Local 6)					
1971	233 (29%)	89 (38%)	1,523	1,266	20.3%
1970	235 (29%)	89 (38%)	1,491	1,351	10.4%
1969	229 (29%)	83 (36%)	1,660	1,368	21.3%

Table 5
COMPARISON OF AVERAGE HOURS WORKED BY APPRENTICESHIP-TRAINED JOURNEYMEN AND JOURNEYMEN NOT TRAINED IN APPRENTICESHIPS, BY YEAR: IRONWORKERS UNIONS

Unions (and years) studied) (1)	Journeymen in Sample (Percent of active membership) (2)	Apprenticeship Graduates (percent of sample) (3)	Average Hours Worked by:		Percentage Differential [(4-5)/5] (6)
			Apprenticeship Graduates (4)	Journeymen Not Trained in Apprenticeship (5)	
Austin					
(Local 482)					
1970	38 (16%)	10 (26%)	1,658	1,554	6.7%
Houston					
(Local 84)					
1971	156 (13%)	30 (19%)	1,450	1,465	− 1.0%
1970	156 (13%)	30 (19%)	1,291	1,376	− 6.6%
Columbus					
(Local 172)					
1970	86 (13%)	20 (23%)	1,486	1,403	5.9%
1969	81 (12%)	17 (21%)	1,701	1,395	21.9%
1968	78 (12%)	13 (17%)	1,732	1,534	12.9%
Chicago					
(Local 1)					
1971	228 (11%)	77 (34%)	1,509	1,313	14.9%
1970	256 (13%)	79 (31%)	1,599	1,365	17.1%
Oakland					
(Local 378)					
1971-72	155 (15%)	84 (55%)	1,526	1,316	16.0%
1970-71	161 (15%)	84 (52%)	1,618	1,490	8.6%
1969-70	160 (15%)	86 (54%)	1,740	1,664	4.6%
San Francisco					
(Local 377)					
1971-72	183 (16%)	68 (37%)	1,443	1,472	2.0%
1970-71	189 (16%)	71 (38%)	1,574	1,519	3.6%
1969-70	191 (16%)	72 (38%)	1,654	1,612	2.6%

Table 6
COMPARISON OF AVERAGE HOURS WORKED BY APPRENTICESHIP-TRAINED JOURNEYMEN AND JOURNEYMEN NOT TRAINED IN APPRENTICESHIPS, BY YEAR: PLUMBERS AND PIPEFITTERS UNIONS

Unions (and years) studied) (1)	Journeymen in Sample (Percent of active membership) (2)	Apprenticeship Graduates (percent of sample) (3)	Average Hours Worked by:		Percentage Differential [(4-5)/5] (6)
			Apprenticeship Graduates (4)	Journeymen Not Trained in Apprenticeship (5)	
Atlanta					
(Local 72)					
1970	83 (8%)	31 (37%)	1,476	1,466	0.7%a

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New York (Plumbers Local 1) 1970	85 (3%)	20 (23%)	1,500	1,506	− 0.4%
Austin (Local 286) 1970	38 (10%)	13 (34%)	1,810	1,776	2.2%
Houston (Pipefitters Local 211) 1971 1970	130 (4%) 130 (4%)	27 (21%) 27 (21%)	1,743 1,930	1,358 1,820	28.4% 6.0%
Houston (Plumbers Local 68) 1971 1970	172 (17%) 179 (18%)	52 (30%) 53 (30%)	1,841 1,865	1,822 1,720	1.0% 8.4%
Columbus (Local 189) 1971-72 1970-71 1969-70	129 (13%) 126 (13%) 126 (13%)	49 (38%) 47 (37%) 48 (38%)	1,707 1,709 1,872	1,539 1,645 1,843	10.9% 4.0% 1.6%
Chicago (Plumbers Local 130) 1971-72 1970-71	299 (7%) 279 (7%)	132 (44%) 121 (43%)	1,925.8 1,877.5	1,871.3 1,822.6	2.9% 3.0%
Oakland (Plumbers Local 444) 1971 1970 1969 1968 1967 1966 1965	189 (24%) 189 (24%) 182 (23%) 174 (22%) 153 (19%) 148 (19%) 141 (18%)	88 (47%) 90 (48%) 83 (46%) 78 (45%) 66 (43%) 59 (40%) 56 (40%)	1,609 1,579 1,640 1,643 1,524 1,734 1.752	1,551 1,478 1,567 1,526 1,446 1,621 1,638	3.7% 6.8% 4.7% 7.7% 5.4% 7.0% 7.0%
San Francisco (Local 38) 1970-71 1969-70 1968-69 1967-68 1966-67 1965-66	544 (20%) 543 (20%) 533 (20%) 511 (20%) 482 (20%) 462 (20%)	149 (27%) 148 (27%) 140 (26%) 135 (26%) 128 (27%) 125 (27%)	1,454 1,455 1,608 1,549 1,405 1,614	1,407 1,406 1,562 1,549 1,434 1,612	3.3% 3.5% 2.9% 0.0% − 2.1% 0.1%

a Strict referral system.

Table 7

COMPARISON OF AVERAGE HOURS WORKED BY APPRENTICESHIP-TRAINED JOURNEYMEN AND JOURNEYMEN NOT TRAINED IN APPRENTICESHIPS, BY YEAR: SHEET METAL WORKERS UNION

Unions (and years) studied) (1)	Journeymen in Sample (Percent of active membership) (2)	Apprenticeship Graduates (percent of sample) (3)	Average Hours Worked by:		Percentage Differential [(4-5)/5] (6)
			Apprenticeship Graduates (4)	Journeymen Not Trained in Apprenticeship (5)	
Atlanta (Local 85)					
1970	99 (13%)	24 (24%)	1,603	1,318	21.6%
Houston (Local 54)					
1971	112 (14%)	48 (43%)	1,762	1,610	9.4%
1970	112 (14%)	48 (43%)	1,720	1,573	9.3%
Columbus (Local 98)					
1971-72	83 (9%)	27 (33%)	1,620	1,313	23.4%
1970-71	93 (9%)	27 (29%)	1,812	1,711	5.9%
1969-70	92 (9%)	24 (26%)	1,652	1,646	0.4%
1968-69	85 (9%)	22 (26%)	1,947	1,816	7.2%
Jackson (Local 406)					
1971	57 (3.6%)	36 (63%)	2,004.9	1.625.6	23.3%
Chicago (Local 73)					
1970-71	268 (4%)	61 (23%)	1,828	1,819	0.5%
1969-70	263 (4%)	61 (23%)	1,897	1,916	− 1.0%
Oakland (Local 216)					
1971	188 (16%)	102 (54%)	1,640.2	1,510.8	8.6%
1970	203 (17%)	105 (52%)	1,686.4	1.574.3	7.1%
San Francisco (Local 104)					
1971	156 (21%)	78 (50%)	1,487	1,472	1.0%
1970	169 (23%)	85 (50%)	1,524	1,513	0.7%

for more than one year). Six locals showed mixed results of differentials between average hours worked of less than 1%. That three of these were United Associations locals may reflect the fact that the plumbers seem to have more formal hiring hall arrangements than the other unions do. These arrangements would help to explain why, in the plumbers' unions which consistently had differentials greater than 1%, the differentials exceeded 10% in only two years. Formal hiring halls probably spread work more evenly in

the plumbers' unions than do the less formal methods of job search common to other crafts.

The data in Tables 2 through 7 further reveal that of 119 percentage differentials, 100 were greater than 1%. Only 10 differentials were less than -1%, while nine fell between -.9% and .9%. Thus 84% of the cases support the hypothesis that apprenticeship-trained craftsmen are more broadly trained and suffer less from unemployment than other journeymen. Regardless of whether one considers only local unions or the total number of comparisons, then, the cases supporting the hypothesis outnumber the cases opposing it by 10 to one.

The hours-worked differentials which are favorable to apprenticeship as a source of training are as large as they are numerous. There were 31 differentials between 10% and 20%, 11 between 20% and 40%, and three exceeding 40%. Thus, nearly half of the "favorable" comparisons exceeded 10%; by contrast, only one "unfavorable" comparison was below -10% (-17.6%).

Methodological Difficulties

Unfortunately, the data are incomplete or otherwise imperfect for several reasons. First, there are gaps in the data because not all unions gave access to their information. Second, some information is unreported or misreported to the pension fund offices by contractors. Third, records on apprenticeship graduates were often unobtainable, incomplete, or so disorganized that some information may have been overlooked.

A possible conceptual difficulty is that our definition of apprenticeship is confined to programs registered with the Bureau of Apprenticeships and Training (BAT) or state apprenticeship agencies. Although unregistered programs turn out as many craftsmen as do registered programs, the registered programs are much more uniform in quality and information is more easily obtained regarding their graduates. Even so, one must recognize that not all registered apprenticeship programs are alike; instead, the nature and quality of the programs vary widely among trades and among local unions in each trade. Some programs are quite new and experimental while others are decades old. Some are scrupulously supervised and coordinated; others have practically no direction. The quality of instruction is not uniform, and instructional facilities vary greatly in their usefulness. Many of the older programs had no classroom instruction, but few are without such related training now. Still, the quality of apprenticeship training programs within a trade is more uniform than are most other broad categories of training, such as vocational education.

Another methodological difficulty is apparent—namely, that the number of hours a man spends at work is a function of more than training alone. Many influences affect his work record. For example, whenever it was learned that a person suffered prolonged sickness or disability during a

year, his hours for that particular year were stricken from the sample. Of course, perfect information was not available on all illnesses and disabilities, but these were assumed to be independent of training backgrounds. (In the case of disabilities, however, if apprenticeship-trained journeymen are safer workers and thus likely to have fewer work-related accidents, they should lose fewer man-hours because of such injuries. This point would support the hypothesis that apprenticeship training produces superior craftsmen.)

There are some factors affecting hours worked which would not be likely to affect the average for either group more than the other. Among these are nepotism, age, and incidence of moonlighting.

Where nepotism is involved in allocating work, employment tends to be granted regardless of skill or capability. An employee is likely to work more steadily if he has been working for his father or another relative who employs him regardless of his merit. However, there is no reason to expect any difference in the incidence of this situation between apprenticeship-trained and nonapprenticeship-trained journeymen. The assumption is that a journeyman's likelihood of working for a relative is independent of his training.

Regarding age, one might reason that because older construction workers might not be able to perform well on certain types of construction jobs which are demanding in terms of physical exertion or pace, they would be handicapped in the labor market and thus likely to work less. On the other hand, with age come greater maturity, knowledge, and experience—characteristics which would make older workers more attractive to employers. Whether increased experience or diminished physical ability has the greater influence on hours worked depends on the nature of the trade and specialty and type of work under consideration. In the few samples in which ages were obtained as well as hours worked, age was found not to be a factor. That is, up until almost immediately before retirement, experience gained over years of work at the trade counterbalanced diminished physical capacity lost over the years. One might reasonably expect that since apprenticeship programs have been registered only since the National Apprenticeship (Fitzgerald) Act of 1937, apprenticeship-trained journeymen are, on the average, a younger group than other journeymen. However, since the advantageous effects of growing old appear to balance the disadvantageous effects, the younger age of apprenticeship-trained journeymen would not give them any undue benefit in the comparison of hours worked.

Journeymen who moonlight as contractors would tend to have fewer hours reported to the pension funds, since only hours worked as employees are reported. The effect of moonlighting on our results is probably insignificant because the practice is forbidden by most unions and because journeymen who were known to have moonlighted were excluded from the

samples. Any moonlighters remaining in the samples may have been non-apprenticeship-trained journeymen who had to work as contractors on small jobs because they could not find regular employment as journeymen. On the other hand, moonlighting is a transitional step to becoming a full-fledged contractor, and since the best craftsmen are likely to become contractors, apprenticeship-trained men would be more than proportionately represented among those workers who moonlight as contractors. However, on the whole, this influence probably affects neither group more than the other.

Influence of Traveling on Hours Worked

A factor which may bias the average hours worked in favor of apprenticeship-trained journeymen is the incidence of traveling. As previously mentioned, travelers from other locals were excluded from the samples. However, if a craftsman in the local under study traveled outside the area in which his pension fund was in effect, his hours worked for the year may be understated.[8] The key question is: Do apprenticeship graduates travel more or less than other journeymen? The answer is probably less, since nonapprenticeship-trained mechanics are more likely to encounter unemployment in a given area and be forced to seek employment in other areas. Although this phenomenon would bias the hours-worked comparisons in favor of apprenticeship graduates, the results would be consistent with the hypothesis that the better trained journeymen are products of the apprenticeship system.

The Influence of Referral Systems

Probably the most important of possible influences on hours worked is the referral system. Depending on the nature of the system used, a referral procedure could bias the data to favor either apprenticeship-trained or non-apprenticeship-trained journeymen. If a formal hiring hall system is used, or if the referral system is organized on a "first-in, first-out" basis, as in some plumbers' locals, the referral system may have the effect of assisting less competent people to find jobs, thus effectively reducing differentials between apprenticeship-trained and nonapprenticeship-trained journeymen. On the other hand, if the apprenticeship-trained craftsmen are placed in a preferred classification, such as an "A" section or a preferred seniority section, and if the nonapprenticeship-trained workers tend to be more than proportionately represented in the less preferred categories ("B," "C," or

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8 Some pension funds cover wide areas, such as the ironworkers' pension fund in San Francisco, which is part of one that covers California, Arizona, and Nevada. While other pension funds are more localized, some local unions have reciprocal agreements with other locals so that hours-worked data may be transferred.

lower seniority classifications), then the referral system will operate in favor of former apprentices and consequently increase the differential between them and other journeymen.

To summarize, some extraneous influences on hours fit the hypothesis that apprenticeship-trained craftsmen will usually experience more steady employment than nonapprenticeship-trained workers. The other influences "wash out," showing no significant overall bias for or against either group. One exception is the referral system, which can operate in favor of either group, depending on the manner in which it is organized.

Possible Alternative Explanations of the Results

As convincingly as the data appear to support our contention that apprenticeship is superior to other sorts of training, the correlation between type of training and hours worked may be spurious. Other factors may be responsible for the fact that apprenticeship graduates work more than other journeymen. Several possible explanations are considered below.
Business agents show favoritism in referrals to apprenticeship graduates

This assumption is possible, but not likely. Since most local union members have not been trained in apprenticeships, a business agent who wished to remain in office would be foolish to discriminate against the majority of his members. Besides, it is difficult to imagine a business agent's motive for showing this kind of favoritism.
The superior performance of apprenticeship-trained journeymen is due to greater native ability, motivation, or education

Since most apprentices have not received trade-related vocational education, it is doubtful that educational levels alone cause differences between the two types of journeymen. If the trade-related training received in apprenticeship does not produce wider ranges of skills, academic high school preparation should not be expected to cause such differences.

If native ability or motivation is responsible for the apprenticeship/non-apprenticeship differentials, it is not clear how apprenticeship programs discover which applicants have more native ability or motivation than the journeymen who have "picked up the trade." If anything, workers who have learned on the job rather than through formal instruction may have to have more native ability, in order to master their trades, than do apprentices. However, it is possible that unions can tell which potential apprentices have the greatest motivation or native ability; if so, perhaps the entrance requirements for apprenticeship systems are more valid than many people currently believe.
Apprenticeship graduates work more because they have greater attachment to the labor market

This argument is highly speculative and scarcely amenable to proof. If

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apprenticeship-trained journeymen are, indeed, more closely attached to the construction industry, it may be because they are making better livings in the industry than men without apprenticeship training. Journeymen who have not served apprenticeships may move into and out of the industry more often, but if so, the reason may be that they lack many skills necessary to work full time in construction. In other words, their more casual attachment to the industry may be a matter of necessity rather than choice.

The better showing of apprenticeship graduates is due to journeyman upgrading programs, not to apprenticeship training

This is possible, but journeymen training closely resembles apprenticeship training, to the extent that some journeymen attend apprenticeship classes as part of their upgrading programs. Moreover, there are indications that apprenticeship graduates are more likely to take advantage of journeyman upgrading opportunities, suggesting that apprenticeship teaches men the value of keeping their skills and training up to date.

Conclusions from Hours-Worked Comparisons

The results of numerous comparisons of average hours worked by apprenticeship graduates and by other journeymen, while significant, do not prove that apprenticeship is preferable to other forms of training. Several alternative interpretations of these results have been advanced, but they do not seem convincing. Nonetheless, if other interpretations are offered, they will be considered seriously. Although no theory has been proved by the foregoing analysis, substantial information supports our hypothesis that formal apprenticeship is, in fact, the superior form of training in construction.

Advancement to Supervisory Positions

To further test the merits of apprenticeship compared with other forms of training, a second measure was developed: the percentage of the supervisory work force (foremen, general foremen, and job superintendents) comprised of apprenticeship graduates. The supposition was that even though apprenticeship is not designed explicitly to train supervisors, the broad range of skills acquired in apprenticeship, including blueprint reading and laying out work, should prepare apprentices to advance into supervisory positions easily. (This point of view was shared by most business agents and apprenticeship coordinators.) If apprenticeship actually is a better form of training for supervisors than other routes, apprenticeship graduates should appear as foremen and superintendents in relatively greater numbers than other mechanics. For example, if 30% of a given union's membership were trained in apprenticeships, but 50% of the supervisors from that union were so trained, support would be given to the contention that

apprenticeship-trained mechanics are more likely to become supervisors than other journeymen.

Accordingly, the names of workers currently employed as foremen and superintendents were collected from cooperative contractors and checked with apprenticeship coordinators and BAT files to determine the number who had served apprenticeships. In each case the proportion of apprenticeship-trained supervisors was compared with the proportion of journeymen in the craft who had received apprenticeship training. The results of these comparisons are summarized in Table 8.

Table 8

COMPARISONS OF PROPORTIONS OF APPRENTICESHIP GRADUATES AMONG JOURNEYMEN AND SUPERVISORS SURVEYED, BY UNION, 1971-1972

Union	Percentage of Journeymen Who Had Served Apprenticeships (1)	Number of Supervisors (2)	Number of Supervisors Who Had Served Apprenticeships (3)	Percentage of Supervisors Who Had Served Apprenticeships (3)/(2) (4)
Bricklayers				
Atlanta (Local 8)	26%	32	5	16%
Columbus (Local 55)	26%	61	17	28%
San Francisco (Local 7)	15%	33	15	45%
Oakland (Local 8)	23%	30	18	60%
Carpenters				
Austin (Local 1266)	23%	41	6	15%
Columbus (Local 200)	22%	134	24	18%
Jackson (Local 1471)	22%	91	28	31%
IBEW				
Atlanta (Local 613)	32%	49	24	49%
Houston (Local 716)	31%	351	153	44%
Columbus (Local 683)	51%	143	73	51%
Jackson (Local 480)	51%	30	16	53%

San Francisco (Local 6)	38%	459	205	45%
Oakland (Local 595)	55%	341	183	54%
Contra Costa (Local 302)	57%ª	56	37	66%
Ironworkers				
Columbus (Local 172)	23%	58	17	29%
Chicago (Local 1)	34%	112	44	39%
San Francisco (Local 377)				
Oakland (Local 378)	35%ᵇ	130	42	32%
Plumbers and Pipefitters				
Atlanta (Local 72)	37%	88	41	47%
Austin (Local 286)	34%	20	11	55%
Houston (Pipefitters Local 211)	21%	87	25	29%
Chicago (Plumbers Local 130)	44%	229	198	86%
Oakland (Local 444)	47%	167	96	57%
Sheet Metal Workers				
Atlanta (Local 85)	24%	34	9	26%
Houston (Local 54)	43%	139	82	59%
Columbus (Local 98)	33%	109	40	37%
Jackson (Local 406)	63%	25	21	84%
Chicago (Local 73)	23%	633	192	30%
Oakland (Local 216)	54%	121	76	63%

a Not from hours-worked samples.

b Data on supervisors include men who transferred from other locals but for whom it was not possible to obtain information on training backgrounds.

As Table 8 shows, the results of the supervisors' comparisons, while more mixed than those of the hours-worked comparisons, still indicate that apprenticeship-trained craftsmen are relatively overrepresented in supervisory positions, presumably because of the nature of their training. In 17 cases, the percentage of apprenticeship-trained supervisors exceeded the percentage of apprenticeship-trained journeymen by five or more percentage points. In six other instances there were differences of fewer than five percentage points. Thus the number of comparisons "favorable" to apprenticeship training was more than three times greater than the number of "unfavorable" comparisons, while several cases produced ambiguous results.

Unfortunately, there were few returns from general contractors who employ many bricklayers, carpenters, and ironworkers. Since electrical, sheet metal, and plumbing contractors were quite responsive, most of the comparisons were obtained from those crafts. Interestingly, the latter are the crafts requiring the greatest nonmanipulative skills; perhaps that is why apprenticeship graduates in those trades seemed to fare so well in the comparisons of supervisory personnel.

As was true in the hours-worked study, numerous alternative explanations are available for the phenomenon of relatively large numbers of apprenticeship graduates in the supervisory ranks. Most of these—favoritism, the effects of native ability or education, greater attachment to the labor market, or the effect of journeyman upgrading—have been dealt with already. An additional explanation—a natural proclivity toward organization of effort and leadership ability—is tempting, for the best mechanic is not necessarily the best supervisor. Undoubtedly many are good leaders simply because others follow them. However, it requires a substantial leap of faith to conclude that apprenticeship graduates become supervisors not because of their training but solely because of their aura of leadership.

At least one factor tends to work against apprenticeship graduates becoming foremen and superintendents. Apprenticeship graduates are younger, on the average, than other mechanics because apprenticeship programs are relatively new in many areas, and many graduates are comparative newcomers to their crafts. Some contractors have employed the same supervisors for years and are reluctant to replace them with younger hands, thus making accession to the supervisory ranks difficult for otherwise qualified apprenticeship graduates. Still, the high proportion of former apprentices in supervisory positions indicates that apprenticeship training imparts skills which could otherwise be learned only through many years of work experience.

Further Evidence on Supervisory Advancement: Atlanta Sheet Metal Workers Survey

The results of a survey made independently of this study by Sheet Metal

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Workers Local 85 of Atlanta support our findings concerning the training backgrounds of supervisory personnel. Questionnaires were distributed to journeyman members to determine which, if any, apprenticeship schools they had attended, any related training received off the job, dates of entry into the trade, and current and previous supervisory positions.

Of 138 members returning questionnaires, 84, or 61%, claimed to have been trained in union apprenticeship schools. (The marked discrepancy between this figure of 60.9% and the estimate of 24% indicated by the sample included in Table 9 may be explained by a number of factors. Apparently apprenticeship graduates attend union meetings more frequently than other members do and, hence, would be more likely to receive and return such questionnaires. Also, the line reading "apprenticeship school attended" may have indicated to some nonapprenticeship-trained members that they were not to return the questionnaire. Finally, the lines indicating interest in supervisory positions held may have dissuaded some men in nonsupervisory positions from answering the questionnaire.) Seventeen members reported backgrounds with formal training in the trade which was almost certainly not of the union apprenticeship variety, and 37 reported little or, in most cases, no formal training in the trade (see Table 9).

Although the high percentage of apprenticeship-trained members indicates that this sample is not representative of the union as a whole, much information can still be gleaned from the replies to the questionnaire. For example, 32 out of 84 apprenticeship graduates, or 38%, were supervisors (general managers, superintendents, and foremen); six, or 35%, of those

Table 9

POSITIONS HELD BY JOURNEYMAN UNION MEMBERS,
BY TYPE OF TRAINING:
SHEET METAL WORKERS LOCAL 85, ATLANTA, 1971

Source of Training	Supervisors Superintendents (including general managers)	Foremen	Journeymen	Other[*]	Total	Supervisors as Percentage of Total
Union apprenticeship programs	7	25	49	3	84	38.1%
Other formal training[**]	1	5	8	3	17	35.3%
No formal training	1	7	26	3	37	21.6%
Totals	9	37	82	9	138	33.3%

[*] Includes union business managers and apprenticeship coordinators, mechanics working outside union jurisdiction, self-employed, unemployed, and retired.
[**] On-the-job training, vocational schools, correspondence schools, and military training.
Source: Atlanta Sheet Metal Workers Local 85 survey.

with formal training other than apprenticeship were supervisors; but only eight, or 22%, of those with no formal training were in supervisory positions. Table 9 demonstrates the superiority of formal training programs as preparation for supervisory work, but it does not indicate any clear advantage for apprenticeship as a training background.

Tables 10 and 11, however, show that apprenticeship is becoming a more and more important source of both journeymen and supervisors. Table 11, in particular, shows that while five of the seven supervisors with no formal training (one did not report his source of training) and all six supervisors with formal training other than through apprenticeship entered the trade *before* 1950, 25 of the 32 supervisors who completed apprenticeships entered the trade *after* 1950. It appears that while roughly the same percentage of apprenticeship graduates and members with other formal training have advanced to the ranks of foremen and superintendents, the apprenticeship graduates have done so after spending much less time in the trade. This finding reinforces our previous conclusion that apprenticeship not only is a superior training ground, but in many cases offers a shorter route to supervisory status.

Table 10

DATES OF ENTRY INTO THE UNION,
BY TYPE OF TRAINING:
SHEET METAL WORKERS LOCAL 85, ATLANTA, 1971

Source of Training	Before 1940	1940-1949	1950-1959	1960-Present	Total
Apprenticeship	1	18	33	32	84
Other formal training	6	9	1	1	17
No formal training	10	14	4	8	36
Totals	17	41	38	41	137[a]

[a] Not all respondents supplied their dates of entry into the union.
Source: Atlanta Sheet Metal Workers Local 85 survey.

Table 11

DATES OF ENTRY INTO THE UNION
BY SUPERVISORS, BY TYPE OF TRAINING:
SHEET METAL WORKERS LOCAL 85, ATLANTA, 1971

Source of Training	Before 1940	1940-1949	1950-1959	1960-Present	Total
Apprenticeship	0	7	15	10	32
Other formal training	2	4	0	0	6
No formal training	2	3	1	1	7
Totals	4	14	16	11	45

Source: Atlanta Sheet Metal Workers Local 85 survey.

Conclusions and Implications for Minority Admission into Building Trades Unions

This study is the first to measure objectively the relative worth of apprenticeship and nonapprenticeship sources of training in the construction industry. Although, because of methodological difficulties inherent in this type of study, one cannot say conclusively that apprenticeship offers the better preparation for a craftsman in the construction labor market, there is a large weight of evidence in agreement with this hypothesis. In practically every union studied, apprenticeship graduates worked more, on the average, than did other journeymen, indicating that the broader training received in apprenticeship enables the mechanic to perform a wider variety of tasks than his counterpart who has not graduated from apprenticeship. Second, in the majority of unions studied, apprenticeship graduates proved to be more heavily represented in the supervisory ranks than in the membership as a whole, indicating that apprenticeship-trained journeymen are more likely to advance into supervisory positions than are persons without apprenticeship training.

Implications for increased minority participation in the construction industry

In view of the advantages that an apprenticeship-trained craftsman appears to have, public policy should continue to aim at increasing apprenticeship opportunities as the most useful means of entry and upgrading for minority groups within the construction industry. When measured by the standards of regularity of employment, stability of earnings, and advancement into supervisory positions, the apprenticeship system is the most desirable method of entry for minorities *in the long run.*

Nationally, significant gains have been made in minority representation in construction apprenticeship classes since 1960, when only 2.2% of apprentices were members of minorities.[9] By the end of 1968, minorities comprised 7.2% of all construction apprentices, while at the end of 1972, 15.1% of apprentices were minorities.[10] Apprenticeship outreach programs of the type developed by the Workers Defense League in New York in 1964 are largely responsible for this success. Support for these programs should be continued. However, since apprenticeship outreach programs seem to vary in effectiveness from place to place and by type of sponsor, a review of the effectiveness of all outreach programs on a continuing basis would be very useful.

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[9] Ray Marshall and Vernon M. Briggs, Jr., *The Negro and Apprenticeship* (Baltimore: Johns Hopkins Press, 1967), 28.

[10] U.S. Department of Labor, Office of Information, News Release No. 73-206 (May 27, 1973). These data refer only to apprentices in programs serviced by the U.S. Bureau of Apprenticeship and Training.

Despite progress with apprenticeship classes, the racial composition of the general membership of construction unions—particularly the mechanical trades—has changed very little.[11] If substantial progress is to be made in improving minority participation in the general membership of construction unions in the 1970s, all of the routes which have been open to white workers should be opened to minorities. This paper and other studies have shown that although there is some variation by trade, the majority of white journeymen have entered the unions without serving apprenticeships. On the basis of equity alone, one could argue that such routes should be open to nonwhites as well.

In response to such arguments, some union officials counter that they have been trying for years to "close the back door" to union membership and bring everyone through apprenticeship—which offers a better entry route. Some of these officials express fear that their unions will be inundated with incompetent nonwhite craftsmen. Many also claim that the apprenticeship system will be undermined.

Some union concerns in this issue are legitimate and realistic and should be recognized; others are not and should be disregarded. Since apprenticeship training provides a fine preparation for the construction worker, it would be useful to extend its benefits to a greater proportion of skilled craftsmen. To the extent that apprenticeship is expanding, extension of benefits is a good thing. However, it is almost certainly true that for some of the union spokesmen, hearty endorsement of apprenticeship as an entry method is motivated in part by a desire to close nonapprenticeship routes to minorities. Moreover, nonapprenticeship entry routes are unlikely to be abandoned altogether. Although apprenticeship provides training for the core of broadly skilled workers, there is also a need for specialists. In addition, the direct admission route plays an important role in union organization efforts—both in unionization of open shops and in absorption of potentially competing skilled individuals.

Second, it would be unwise to increase union membership only to expand the ranks of unemployed journeymen sitting on the bench. This could happen if the unions were inundated with qualified nonwhite journeyman applicants. However, the numbers of minority craftsmen ready, willing, and able to join building trades unions are vastly overestimated. Thus general inundation of the trades is an unfounded fear. Nevertheless, at times in certain labor markets, the employment outlook is so bleak that it would be unwise to admit any new members.

Third, it would be foolish to force the building trades unions to accept incompetent workers into their membership. High quality craftsmanship

[11] See Herbert Hammerman, "Minorities in Construction Referral Unions—Revisited," *Monthly Labor Review*, 96:5 (May, 1973), 43-46.

should not be sacrificed in the interest of speedy integration. No one gains from slipshod training or poor workmanship, for the former fails to provide real employability and the latter increases both costs and physical danger. The use by unions of valid tests and standards which are relevant to the job in order to screen candidates for journeyman status is certainly justified.

Finally, the apprenticeship system should not be undermined. It would be difficult to prove, however, that apprenticeship is now suddenly being undermined by nonwhite applicants for direct admission when such large proportions of white union workers have entered the trades in this manner for years.

To summarize, union arguments to shut off nonapprenticeship entry routes to minorities are not persuasive. Qualified minority craftsmen should be able to join building trades unions just as the current white membership of those unions has. Of course, all journeymen who come through nonapprenticeship routes are likely to have inferior or narrower training compared to apprenticeship graduates. Thus efforts should be made to encourage these workers to enroll in journeyman upgrading classes so they can improve and broaden their skills.

In conclusion, much can be done to open up the traditional apprenticeship and nonapprenticeship routes to membership in building trades unions. First, each trade could establish at the national level a tripartite selections board, composed of representatives from the union, contractors, and the public, to establish the criteria for journeyman and apprenticeship qualifications for that trade. These criteria might not be uniform in all areas, since labor market conditions vary from place to place, but the range of permissible variation would be set by the national board, which would also act as an appeals tribunal for individuals who felt unjustly treated by local selection procedures.

Second, it will be necessary to disseminate information on apprenticeship and nonapprenticeship entry standards in the minority community. Third, to translate this information into minority recruits, journeyman outreach programs should be developed and added to apprenticeship outreach efforts in order to inform minority journeymen about possible union entry routes and to assist such journeymen in preparing for tests and interviews, obtaining letters of recommendation from contractors, obtaining loans to assist in paying high initiation fees, and the like.

Fourth, union locals, as a good faith effort, should involve minorities at every stage in the selection process, both for journeymen, minority journeymen, and apprentices. In cases where executive boards interview prospective journeymen, minority journeymen should sit on the executive boards. In situations where local examining committees supervise and grade journeyman examinations, minority journeymen should comprise part of the examining committees. Nonwhites should be represented on joint appren-

iceship committees as well. Although much obviously depends on the character and power of the minorities serving in these agencies, the presence of minority officials would help nonwhites to feel that their applications were being seriously and fairly processed.

A final recommendation is that better links be established between apprenticeship and public vocational education (which enrolls a significant proportion of minority youngsters). A recent study of vocational education by the Battelle Institute indicated that the curriculum used in electrical construction programs did not provide graduates with even minimum qualifications required of applicants for apprenticeship programs in the electrical industry.[12] Some work has been done to improve vocational education in construction,[13] but much remains.

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[12] Battelle Memorial Institute, "An Exploratory Study to Analyze New Skill Content in Selected Occupations in Michigan and the Mechanism for Its Translation into Vocational Education Curriculums," (Columbus, Ohio: 1972).

[13] See Construction Industry Collective Bargaining Commission, *Teamwork Toward Tomorrow* (Washington, D.C.: Government Printing Office, 1971). Also, see "From the Ground Up," *Manpower*, 5:2 (February, 1973), 3-8.

LABOR IN CONSTRUCTION: RECENT RESEARCH AND POPULAR WISDOM

Howard G. Foster

In recent years, labor markets and labor relations in the construction industry have been in the forefront of public debate with respect to a variety of social and economic ills. The industry is said to be stifled by craft unions which impede efficiency by imposing restrictive work practices, extort outsized wage gains from employers and consumers alike in the process of pricing the single-family home out of the reach of the average would-be buyer, enforce these wages through a network of limitations on the hiring process and training activities, and purposefully exclude blacks and other minorities from competitive participation in the job market. These indictments are found in both popular periodicals and (to a lesser extent) in scholarly journals; even those accounts which, on their faces, chronicle the abuses and failings of the labor market in general often seek most of their specific illustrations in the building trades.

The construction unions have been placed on the defensive, and in their defensiveness they have reacted with hyperbole much like that of their critics. In the face of the charge that racial discrimination is pervasive, union spokesmen are reluctant to admit that it exists at all. Arguments which could plausibly support greater-than-usual wage increases are advanced to justify increases of stunning proportions. The myths of the prosecution are matched by the myths of the defense, and, in the process, popular understanding of the issues and their roots is obscured.

This obfuscation is especially dismaying in light of the increasing amount of dispassionate and carefully documented research which has been undertaken in the past few years. Construction has attracted an impressive academic following, and though there is still a long way to go, the recent literature contains some real advances in unraveling the intricacies of this complex industry. Unfortunately, as in any field, the dissemination of knowledge is frequently a more deliberate process than its creation.

The purpose of this paper, therefore, is to explore some of these notions about construction labor in the context of salient research findings. As with any set of controversial subjects, we shall see that there is some merit on both sides. But perhaps most important, it should become clear that bias, hyperbole, and sweeping rhetoric based on nonexistent or anecdotal evidence are no substitutes for balanced and methical analysis.

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The attention usually given to documented or alleged abuses by building trades unions serves to convey the impression that virtually the entire construction industry is unionized. Unfortunately, this impression may have been reinforced by the tendency of researchers and analysts to concentrate their efforts on the role of unions in the labor market. Nevertheless, the fact remains that construction has always had a nonunion sector of a not insignificant magnitude, and there is fragmentary evidence to suggest that in the past few years nonunion firms have been capturing an increasing proportion of building work.[1] Though this observation is not intended to depict the unions as helpless weaklings in the face of competition from unorganized contractors, it does follow that there are real constraints on their behavior. These constraints, of course, will operate less effectively in some areas and industrial sectors than in others, but they should lead one to regard with caution such commonly used phrases as "union stranglehold" and "unbridled monopoly power."

The percentage of the construction work force that is unionized is difficult to state with precision, largely because the "work force" itself is subject to a number of conceptual definitions. Perhaps the best available estimate is contained in a recent government survey conducted in conjunction with the monthly population and labor force reports.[2] According to this survey, 40.3% of those workers whose longest-held job was in construction in 1970 were union members. This figure is somewhat lower than others generated in the past decade, in part because of definitional inconsistencies. Nevertheless it would not be correct to say, as a general proposition, that construction is predominantly—let alone overwhelmingly—unionized.

At the same time, it is true that some portions of the industry are more tightly organized than others. Unions tend to be stronger in industrial, public, and large-scale commercial construction; in metropolitan areas; in the north and west; and among the higher skilled workers. Nonunion firms are more likely to operate in small cities and rural areas; in residential and small-job commercial building and remodeling; and in the south. Laborers, according to the aforementioned survey, are less unionized than craftsmen.

It should be noted, however, that the above statements are only generali-

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[1] See Howard G. Foster, "Unions, Residential Construction, and Public Policy," *Quarterly Review of Economics and Business*, 12 (Winter, 1972); Daniel Quinn Mills, *Industrial Relations and Manpower in Construction* (Cambridge: MIT Press, 1972), 16-18; "Nonunion Contractors Winning Sizable Share of Construction Work," *Wall Street Journal*, July 7, 1972.

[2] U.S. Bureau of Labor Statistics, *Selected Earnings and Demographic Characteristics of Union Members, 1970*, Report 487 (Washington, D.C.: Government Printing Office, 1972).

zations, and there are many exceptions. Home building in some large cities is all union; in others, all nonunion. Some of the giants of the industry are unorganized. Moreover, it is not uncommon in some areas to have certain contractors (e.g., masonry, electrical, etc.) strongly unionized and others (e.g., general contractors) predominantly nonunion, with union and nonunion workers side by side on a project. Still, since there is a substantial amount of contractor specialization and hence limited intersector competition, effective union control can be maintained in one branch of the industry, though another operates primarily on a nonunion basis. This control should not be exaggerated, however, for entry by new firms is relatively easy technologically and economically. Recent statements by some national union leaders suggest that the competitive threat of the nonunion sector is not taken lightly.

Finally, it is not always appreciated that the building trades unions are among the most decentralized in the country. Most agreements are negotiated locally with little or no effective input or influence from national headquarters. The substance of these agreements—and, more important, actual practice under them—varies appreciably from area to area even within a given craft. In short, construction unions do not constitute a monolith, and virtually any sweeping statement about the "building trades" is likely to be inaccurate with respect to some of their constituent parts.

Work Rules and Productivity

The rate of technological improvements and gains in worker productivity in construction is commonly thought to lag behind those in other industries, with union-erected barriers to efficient operations as a major culprit. There are, of course, specific examples of resistance to new techniques and the imposition of work rules which artificially inflate man-hour requirements on a given project. The efforts by some locals of the Painters Union to prohibit use of the spray gun and the provision in some Operating Engineers' agreements for workers to attend pumps and other automatic machinery are among the more conspicuous cases in point. The danger arises, however, when individual practices are assumed to prevail throughout the industry and to result in a systematic reduction in productive capacity.

Scholarly research on this subject has taken a variety of approaches, but the results have invariably suggested that the popular image seriously understates the productivity experience in construction and overstates the extent and effect of institutional impediments to efficiency. In the early 1950s, William Haber and Harold Levinson conducted a comprehensive survey of construction labor practices in 16 cities, with input from both labor and management spokesmen. The authors investigated such matters as policies toward the introduction of new techniques and materials, work

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rules, limitations on output, and requiring unnecessary work.[3] The study meticulously outlines the various forms of restriction in the several crafts and discusses their prevalence. Though space does not permit a detailed account of their findings, the overall conclusion was that, despite many individual instances of restrictive policies, the experience of the industry as a whole was much more favorable than the popular wisdom allowed.

With respect to technological innovation, the authors observed that "despite the fact that any attempt to evaluate the overall situation must involve qualifications, it nevertheless is reasonably clear that the building trades unions have been more receptive to new techniques than has been widely believed."[4] Similarly, "An overall evaluation of the extent and importance of union working rules strongly suggests that their adverse effect is much less than has been widely alleged. The most significant charge leveled against the unions—that of an organized restriction of output—has not been supported by the preponderance of the evidence obtained in this survey. Nor have many other widely cited rules appeared upon investigation to be as widespread or restrictive as has often been alleged."[5] It should be stressed that this study was not an apology for the unions; many indefensible practices were identified and their costs estimated. Still, the conclusions cited above point up the need for perspective.

Other studies have attempted to measure productivity more directly. Allan B. Mandelstamm, for example, asked residential contractors and subcontractors in two Michigan cities, Ann Arbor (mostly union) and Bay City (mostly nonunion), to estimate the number of man-hours necessary to complete certain specified functions.[6] Responses for each area were averaged and the averages totaled to determine the aggregate man-hour requirements for the "house." The total was appreciably smaller for Ann Arbor than for Bay City, and within Bay City the total for union firms was much lower than for nonunion firms. Though Mandelstamm acknowledged that these differences have been attributable to a number of factors (differences in *managerial* efficiency for one), and that there was no evidence that the union workers were themselves superior, nevertheless the unions were not associated with *lower* productivity as the popular wisdom would have it.

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[3] William Haber and Harold M. Levinson, *Labor Relations and Productivity in the Building Trades* (Ann Arbor: University of Michigan, Bureau of Industrial Relations, 1956).

[4] Ibid., 153.

[5] Ibid., 189.

[6] Allan B. Mandelstamm, "The Effects of Unions on Efficiency in the Residential Construction Industry: A Case Study," *Industrial and Labor Relations Review*, 18 (July, 1965).

Aggregate measures of productivity change in construction are difficult to devise, owing largely to the absence of a reliable price index. (Prices, of course, are themselves affected by productivity.) Douglas C. Dacy has developed a simultaneous equations model which addresses this problem.[7] The results of the model for the period of 1947-1963 show a yearly productivity advance of about 3%, roughly consistent with the economy-wide experience. Other studies based on aggregate data have produced similar findings.[8]

There has been, to my knowledge, only one attempt to measure changes in physical productivity directly. Sara Behman, using building permit records for Alameda County, California, made detailed estimates of labor requirements for a "typical" house in 1930 and in 1965.[9] For both years, the number of labor hours used for the various operations was derived from estimator's handbooks. The results are expressed in terms of 1,000 square feet of living space to account for the larger average size of new homes in the later year. Behman calculated that over this 35-year period, labor productivity rose by 3.2% per year, a finding largely consistent with those of the aggregate studies. The number of on-site man-hours (excluding plumbers, electricians, and painters) per 1,000 square feet fell from 837 in 1930 to 283 in 1965. It is worth noting, moreover, that residential construction in Alameda County is heavily unionized.

In summary, virtually all systematic studies of productivity in construction appear to belie the notion that the industry is technologically neolithic. Though all the inquiries discussed here have methodological and conceptual limitations, the consistency of their findings is in itself noteworthy. This consistency should at least give pause to those who are prepared to issue general and unqualified indictments.

Exclusionary Practices

The issue of racial discrimination by certain building trades unions has focused much public attention on the ways in which workers gain access to jobs in the construction industry. Racial restrictions, however, are only part of the broader question of the degree to which the supply of labor is regulated by unions—for whatever reason and at whoever's expense—rather than by the interplay of market forces. An article of faith in many quarters is the exercise by unions of a "stranglehold" on labor supply, involving singly

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[7] Douglas C. Dacy, "Productivity and Price Trends in Construction Since 1947," *Review of Economics and Statistics*, 17 (November, 1965).

[8] See Peter J. Cassimatis, *Economics of the Construction Industry* (New York: National Industrial Conference Board, 1969), Ch. 6.

[9] Sara Behman, "On-Site Labor Productivity in Home Building," *Industrial Relations*, 11 (October, 1972).

or together the hiring hall, the closed shop, admissions policies, and apprenticeship programs. The intent here is not to picture the construction labor market as cast in the mold of Adam Smith or to exonerate the unions of all antisocial behavior. Rather, it is to examine some of the more strident charges in the context of recent labor market research and analysis.

At the outset, the notion that unions systematically and purposively limit worker entry in order to force up wage rates should be consigned to the intellectual scrap heap. Two decades ago, Clark Kerr argued that craft unions did not limit supply to raise wages but rather they set wages and then tried to adjust supply accordingly.[10] Though Kerr did not indicate how the wage standards were set in the first place, his basic point is difficult to refute. Given the bargaining structure in the industry and the imbalance of power between labor and management, the unions do not have to restrict supply to win gains from their employers. Indeed, such restrictions may have the effect of aiding the growth of a competing nonunion work force which undercuts negotiated wage rates. The skeptic need only consider the explosive wage increases of the late 1960s and early 1970s in the face of rampant unemployment throughout the industry. Still, the questions remain as to the reasons for and the extent to which entry is controlled.

Union attitudes and policies toward the various elements of the construction labor market cannot be understood without reference to certain important features of that market. By and large, employment is relatively casual, with generally weak attachments between individual workers and employers. Furthermore, the seasonal nature of building activity results in both extraordinarily heavy unemployment during the winter and a need for temporary additions to the work force during the summer. The upshot is a high rate of labor turnover. In any given year, the number of workers with income from construction work is nearly double the *average* number of jobs available. Perhaps more significant is the fact that the number of workers whose *major* source of income is construction is half again greater than average annual employment. Totally unregulated entry, therefore, would constitute a serious threat to the livelihood of workers whose primary attachment is to the construction industry. Thus union barriers to entry are an important *economic* issue only to the extent that they coincide with unfilled jobs; they are in any event an important *social* issue to the extent that they are used to discriminate invidiously between different groups of potential workers.

10 Clark Kerr, "The Balkanization of Labor Markets," in *Labor Mobility and Economic Opportunity,* ed. by E. W. Bakke (New York: Wiley, 1954).

Despite the widespread popular notion that union hiring halls have historically been used as an instrument of job control, there has been surprisingly little empirical investigation of the hiring process in practice. Although it is clear that most building trades unions have always provided a job-referral service for both their members and contractors, it does not follow that this service itself constituted a method for regulating the hiring process. Philip Ross, in a recent valuable study of the origins of the hiring hall in construction, takes pains to distinguish a referral service from a system of control.

A union hiring hall is a union-administered job-referral system whose referrals enjoy advantages over all other job applicants . . . . [W]hat is essential to all hiring halls as defined here is employer agreement or acquiescence in according job preference; it is both historically inaccurate and analytically useless to call union referral services "hiring halls" where there is no job preference.[11]

Prior to the enactment of the Taft-Hartley Act in 1947, there were few instances in which employers were *required* to utilize union facilities when seeking new workers. Control over hiring was exerted, not through a hiring hall, but through the closed shop, which was enforced at the job site by union stewards and business agents. "Employers were free to hire whom they wished, just as long as they were members of the union."[12] Union members were free to seek work on their own, and those who did utilize the union hall for information as to job opportunities had no contractural or practical advantage over those who applied directly at the site.

Since 1947, however, the use and application of the hiring hall, as defined by Ross, has expanded. With the outlawing of the closed shop by Taft-Hartley, and a later ill-fated attack on discriminatory hiring procedures by the National Labor Relations Board, the unions began to adopt formal hiring hall arrangements. In some cases, the formal changes did nothing to alter actual practice based on the closed shop. In others, there were elaborate rules establishing priority preferences in union referrals, based on previous employment, years of experience, local residence, and demonstrated qualifications.[13] At the present time, however, there is little empirical evidence as to how the formal arrangements operate in practice. As Ross concludes,

It is difficult to classify these exclusive hiring halls because the imposition of formal procedures upon a wide variety of local practices has produced situations

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11 Philip Ross, "Origin of the Hiring Hall in Construction," *Industrial Relations*, 11 (October, 1972), 366.

12 Ibid., 368.

13 These priorities are explicitly sanctioned in section 8(f) of the Taft-Hartley Act under the 1959 amendments.

where the formal hiring procedure exists next to a shadow system of job allocation which may or may not correspond to the written rules . . . . The most that we can say is that the degree of enforcement of the written rules depends primarily upon the degree of member unemployment and the inclination of union leaders to exploit the internal political opportunities offered by the hiring hall. . . . On the surface, all hiring halls conform to the legal requirement forbidding discrimination against nonmembers; however, any conflict between hiring hall rules and the attainment of union goals is inevitably resolved in favor of the latter.[14]

From the employer's standpoint, an important feature of the hiring arrangements under which he must operate is the degree of latitude he may exercise in hiring a worker. What little information there is suggests that practices vary greatly from craft to craft and from area to area. On the formal level, a recent study by the U.S. Department of Labor attests to this variety.[15] The study surveyed the formal hiring procedures specified in agreements covering 1,000 workers or more—291 contracts in all. Of these agreements, 132 (45%) provided for "exclusive" work referrals, meaning that the employer is required to use the union hall as the sole source of workers; 98 others were "nonexclusive" in that employers were allowed to hire from other sources; and 61 had no referral provisions at all. Exclusive referral systems were most common among electricians, operating engineers, and plumbers; they were least common among bricklayers, carpenters, ironworkers, painters, and teamsters. Of 82 exclusive systems selected for further analysis, most provided explicitly for nondiscriminatory referrals and the employer's right to reject applicants, and 51 of them specified a procedure by which workers were to be dispatched (mostly on the basis of date of registration, qualified, however, by a priority schedule as noted above). There were substantial variations in both procedures and priority classifications among the several systems.

A somewhat earlier study in California by Gordon W. Bertram also found a variety of formal hiring arrangements.[16] One agreement allowed the contractor to bypass the hall whenever he was hiring in his own local district. In most other agreements, the contractor had the right to request a specific worker from the hall, although the extent to which this request would be honored depended in varying ways on certain eligibility standards (e.g., residency, employment experience in the area) to be applied to the worker in question. Bertram's analysis concluded that, on the whole, hiring practices did conform to the procedures set forth in union agreements.

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[14] Ross, op. cit., 378-379.

[15] U.S. Department of Labor, Labor-Management Service Administration, *Exclusive Union Work Referral Systems in the Building Trades* (Washington, D.C.: Government Printing Office, 1970).

[16] Gordon W. Bertram, *Consolidated Bargaining in California Construction*, Monograph Series No. 12 (Los Angeles: University of California, Institute of Industrial Relations, 1966), Ch. 6.

Despite their variation, "exclusive" hiring hall arrangements frequently allow the employer some flexibility in his hiring decisions. In many instances he is free to rehire workers whom he employed in the past, to hire a certain number of "key" employees without using the hall, to specify a need for a worker with certain qualifications, and to reject applicants he does not deem suitable. At the same time, the formal distinction between exclusive and nonexclusive hiring halls can be a misleading one. One critical responsibility of a local union is to preserve work for its members. When demand is slack, employers will be under pressure to hire local members regardless of contractual language and will frequently solicit workers "voluntarily" through the union rather than hire nonmembers or members of other locals. When jobs are plentiful, an exclusive hiring system may not be rigidly enforced by the union; members may be allowed to seek work on their own regardless of their position on the registration list, and employers may be free to hire nonmembers.

In any event, the hiring hall does constitute a limitation on the employer's freedom to hire whom he pleases. As Bertram observed, "the employment referral standards . . . represent a compromise between contractor and union interests."[17] Nevertheless, one should keep in mind that a union referral service provides some assurance that workers will be available when needed, or at the least that available workers will not remain unemployed for long for want of information as to job opportunities. Whether this advantage is worth the price of some rigidity in hirings is a debatable question, though it is worth noting that the most virulent criticisms of hiring halls do not generally come from employer spokesmen. Employers seldom complain of the ultimate inefficiency in this context—that they are forced to hire a mediocre worker while a much better one remains unemployed. In short, the hiring hall is a response not only to the internal political exigencies of the union but also to the special character of the construction labor market.

Moreover, it is important to understand that rigidity in hiring is to some extent balanced by an extraordinary (for union firms) flexibility in firing. By and large, contractors are free to dismiss workers whenever they desire without regard to seniority or any other criterion. Except for disciplinary dismissals, unions do not challenge the choice of an employer as to whom to retain and whom to let go. The employer is also the sole judge of whether a worker's performance is satisfactory, unlike many other union situations in which such decisions frequently provoke formal grievances.

17 Bertram, op. cit., 92.

18 U.S. Department of Labor, Labor-Management Services Administration, *Admission and Apprenticeship in the Building Trades Unions* (Washington, D.C.: Government Printing Office, 1971).

The question remains, of course, as to how *nonmembers* gain access to construction jobs. To the extent that members in practice have advantages over nonmembers, the issues reduce to union admission policies. The building trades have varying *formal* standards regarding admission, most commonly including prior experience at the trade, membership approval, nomination by a current member, and examinations.[18] But again, the implementation of these standards will usually vary with the state of the labor market. If there is widespread unemployment, applicants with normally acceptable credentials may be refused admission. As others have pointed out, however, these arrangements with respect to both hiring and admission are not qualitatively dissimilar in practice and effect to the operation of seniority systems in a factory. They may, of course, be used systematically to exclude certain groups—notably blacks—but they do not necessarily constitute irrational or inefficient responses to labor markets in an industry whose unemployment rate is typically double the economy-wide average.

Apprenticeship

According to the popular wisdom, building trades unions purposely restrict the number of apprentices in training in order to limit labor supply and thus maintain an artificial shortage of craftsmen. A common "abuse" cited is the contractual apprentice-journeyman ratio, which limits the number of apprentices an employer may hire according to the number of journeymen on his payroll. Usually ignored is the fact that few contractors take on even the number of apprentices they are allowed under the contract. This failure to hire apprentices, to be sure, does not answer the more general criticism that unions restrict entry, for apprentice numbers can be limited in other ways,[19] but it does serve to suggest that the issue is more complex than is commonly supposed.

The extent to which apprenticeship contributes to the overall acquisition of construction skills is difficult to assess; comprehensive data on both apprenticeship and employment patterns are lacking. What is certain, however, is that any generalizations are hazardous indeed. There are wide disparities in the performances of local programs within a single craft, not to mention the more general disparities between crafts. The observations of this writer and others[20] suggest that such crafts as electricians, plumbers, and sheet metal workers generate the largest proportion of their journey-

[19] See, for example, Simon Rottenberg, "The Irrelevance of Union Apprentice-Journeyman Ratios," *Journal of Business*, 34:3 (July, 1961), 384-389.

[20] See especially George Strauss, "Apprenticeship: An Evaluation of the Need," in *Employment Policy and the Labor Market*, ed. by Arthur M. Ross (Berkeley and Los Angeles: University of California Press, 1965), 299-332. Also, Howard G. Foster, "Apprenticeship in the Building Trades: A Sympathetic Assessment," *Labor Law Journal*, 22 (January, 1971).

men through apprenticeship; plasterers, painters, and cement masons, the smallest; and carpenters, ironworkers, and bricklayers, somewhere in between.

Nevertheless, only a fraction of construction workers in the aggregate receive formal training through apprenticeship. For example, one Bureau of Labor Statistics study estimated that in the decade 1965-75 about 41,000 openings per year would result from deaths and retirements alone.[21] In recent years apprenticeship programs for construction trades have graduated about 20,000 persons annually. The figure on openings, moreover, takes no account whatsoever of net growth or out-mobility. Of course, the ratio of openings to graduated apprentices varies greatly from craft to craft, but it is certainly safe to say that no craft fills all its openings with apprentice-trained journeymen. Thus, to the extent that the function of apprenticeship is perceived as generating all workers needed by the industry, the system does not perform adequately.

But this perception would be erroneous. Apprenticeship is not designed to supply the industry with a full complement of rank-and-file journeymen. Not all craftsmen need the extensive training provided by apprenticeship. Every craft includes tasks which can be learned quickly. The carpenter who builds forms for concrete does not need to be as skilled as the one who installs wood trim. Many of these functions can be—and indeed are—picked up by means other than apprenticeship. Thus, while there is certainly a need for workers with a broad range of skills to assume general supervision of the work and to handle the more difficult problems and tasks, it is naive to presume that *all* workers must have this kind of well-rounded training. Indeed, apprenticeship has traditionally supplied a disproportionate number of foremen, superintendents, and even contractors to the industry, as well as the key journeymen who form the basic construction work force and who typically receive more hours of employment during the year than the average craftsman.[22] Unfortunately, there presently is no way to fix accurately the size of this "basic" work force.

None of these statements are to deny that unions are wary of admitting what they consider to be excessive numbers of apprentices into their programs. But given the unions' institutional interest in maintaining the integrity of their crafts,[23] the argument that they purposely try to create and

21 Allan F. Salt, "Estimated Need for Skilled Workers, 1965-1975," *Monthly Labor Review*, 89 (April, 1966), 368.

22 For the latest evidence on this point, see William S. Franklin, "An Analysis of Traditional Routes of Entry into Selected Construction Unions" (Ph.D. dissertation, University of Texas at Austin, 1972). See also the paper by Franklin and Robert Glover in this volume.

23 Mills notes that the unions' "concern about the adequacy of the manpower supply reflects the importance to each union of controlling the work in its trade jurisdiction.

exploit skill shortages is a difficult one to accept. Instead, the size of apprenticeship programs from year to year seems to be primarily a function of rough impressions of the number of workers who can be absorbed in the immediate future. Local apprenticeship committees tend to regard apprentices as *workers* as much as trainees, and their decisions on the number to admit each year are influenced by the extent to which the unions see apprentices as limiting the job opportunities of journeymen. Given the instability and unpredictability of future demand, this behavior is hardly irrational. To be sure, the attempts by these committees to assess systematically the prospective state of the labor market leave much to be desired, but the preference of the unions to err on the side of pessimism is not hard to understand.[24]

Nor do most analyses of apprenticeship take account of the *employer's* role and attitude in the process. To the individual contractor, the hiring of an apprentice may quite reasonably appear to be a bad investment. At the beginning at least, the apprentice is likely to be paid more than his productivity warrants. In addition to the apprentice's wage, the contractor must pay for a journeyman to supervise the work and for any wasted materials resulting from the apprentice's inexperience. Furthermore, the contractor is expected to keep shifting the trainee from one aspect of the job to another, thus failing to capitalize on the experience gained by the apprentice at any one task. (If he does not shift him, of course, the purpose of apprenticeship is subverted.) It seems to be generally acknowledged that the employer does not begin to recoup his investment until the second or third year, when the apprentice has been sufficiently trained to perform some journeyman's work at apprentice wages. Finally, the employer has no guarantee of holding the apprentice after training is completed; although the training may benefit the industry as a whole, the employer alone bears most of the cost. As a result of these considerations, employers often prefer to hire workers trained elsewhere rather than to train their own.

In sum, the performance of apprenticeship in responding to the changing

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Where a union is unable to supply workers to man projects, it may lose its work jurisdiction to nonunion men or to men of another union." Op. cit., 196.

[24] This discussion also bears on the question of whether apprentice numbers are limited by the length of the program. See, for example, Alex Maurizi, "Minority Membership in Apprenticeship Programs in the Construction Trades," *Industrial and Labor Relations Review*, 25:2 (January, 1972). Quite aside from the purely technical (and debatable) question of how long it *should* take to learn a particular trade, I do not see how shortening the programs will increase the total number of trainees. The key question would still be the number *admitted each year,* and if this number is based on future employment prospects, it is not clear that the decisions would be any different irrespective of program length.

manpower needs of the construction industry is limited by the unavailability or nonuse of reliable indicators of future demands, as well as by the lack of correspondence between employer interests and industry interests. Attempts to find a statistical relationship between apprentice numbers in the several crafts and various national economic indicators have not been fruitful[25] (although the national economy is not in any event the appropriate gauge in a process which is based on local decision-making in local markets). Without the development and dissemination of sophisticated planning guides, long-term labor force adjustments probably will continue to rely heavily on other avenues of skill acquisition.[26] And since most other forms of training are not under the direct control of the unions, one may legitimately question how union regulation of apprentice numbers serves artificially to limit the supply of labor.

Minorities and construction

There is no dearth of horror stories about failures of highly qualified black craftsmen to gain entrance to one or another of the building trades unions. Nor is there a lack of data demonstrating the gross underrepresentation of minorities in many of the trades. But the reasons for the small numbers are not solely related to overt discrimination, though such discrimination is certainly an element. The public attention given to the construction crafts would lead one to believe that blacks fare better within skilled occupations in other industries. Such a case is hard to make, and it is becoming harder in each passing year. As Mills has convincingly shown, "The racial unbalance in the building trades is neither greater nor less than in most other skilled crafts, and it is considerably less serious than in higher-status white-collar occupations."[27]

The argument that racial imbalance is a function not only of factors on the demand side, but also of educational deficiencies among potential applicants, has been made more than once. In their oft-quoted study *The Negro in Apprenticeship*, Marshall and Briggs stressed the need for more vocational counseling and preparation for entrance to apprenticeship programs, in order to enable disadvantaged minorities to compete more effectively as applicants.[28] The efficacy of this approach has been demonstrated by the success of the Workers Defense League in helping blacks get into the programs.[29] Again, it is too easy for these observations to be

25 See especially Mills, op. cit., 223-230.

26 These avenues are discussed in Howard G. Foster, "Nonapprentice Sources of Training in Construction," *Monthly Labor Review*, 93 (February, 1970).

27 Mills, op. cit., 148.

28 F. Ray Marshall and Vernon M. Briggs, Jr., *The Negro and Apprenticeship* (Baltimore: Johns Hopkins Press, 1967).

29 See Edward C. Pinkus, "The Workers Defense League," in *Programs to Employ*

read as a whitewash for discrimination. They are not; discrimination does occur, and it occurs with uncomfortable frequency. But the argument from local union leaders that they receive few applications from demonstrably qualified blacks is by no means entirely without foundation.

The most recent evidence from the Equal Employment Opportunity Commission data suggests that progress in integrating the construction unions has been generally slow, despite the proliferation of various "plans" designed to generate greater participation by blacks.[30] But there have been dramatic increases in minority representation in apprenticeship programs. By 1971, black and Hispanic apprentices constituted nearly 12% of total enrollment, and over 8% in the mechanical trades (often characterized as lily-white). Since apprenticeship is not a major avenue of entry in many of the crafts, these figures should not be overdrawn. But neither should they be consigned to oblivion.

The danger of ignoring the modest but steady advance made in this area has been eloquently argued by Wattenberg and Scammon in a recent issue of *Commentary* magazine.[31] There can be little doubt that the activity by governmental and civil rights groups, on both the supply and demand sides, has played an important role in opening more construction jobs to minorities. The peril of ignoring the real progress being made is that these activities will be regarded as failures and lose their support. One need not be satisfied with present conditions to recognize that they are better than the past and in all probability not as good as the future.

Wages and Their Determination

The explosive wage settlements in construction prior to the establishment of the Construction Industry Stabilization Committee tended somewhat to obscure the fact that wage rates in the industry had been rising faster than those elsewhere for many years. But the experience of the late 1960s and early 1970s was remarkable indeed, with some three-year settlements providing for increases of over 60%. This phenomenon, however, was a complex one, and although there has not been an entirely satisfactory explanation of its origins, in all fairness the issue goes beyond the raw exercise of power by the building trades unions.

The most comprehensive analysis of recent construction wage movements is that of Mills.[32] Mills attributes the phenomenon to the interplay of three factors: an extraordinarily strong demand for construction, along

the Disadvantaged, ed. by Peter B. Doeringer (Englewood Cliffs: Prentice-Hall, 1969).

[30] See Herbert Hammerman, "Minority Workers in Construction Referral Unions," *Monthly Labor Review*, 95 (May, 1972); also a sequel in the May, 1973, issue.

[31] Ben Wattenberg and Richard Scammon, "Black Progress and Liberal Rhetoric," *Commentary* (April, 1973).

[32] Mills, op. cit., Ch. 3.

with concomitant manpower shortages in the highly organized and price-inelastic sectors of the industry, especially in the highly industrialized areas of the midwest; generally favorable conditions in the rest of the economy, which resulted in a significant drain-off of manpower available to supplement the existing construction work force; and the decentralized bargaining structure of the industry, which allowed and encouraged a leapfrogging of wages across crafts and localities.

Although Mills' analysis is a welcome tonic to the devil theories often advanced by popular commentators, there remain a number of vexing questions. In the first place, compositional changes in demand are not unique to the 1960s or to the construction industry. Moreover, the question of why tight labor markets elsewhere should divert manpower *from* construction when construction wages were much higher to begin with is not clear. Finally, even if some settlements were consistent with expansionary economic conditions, the very fact that those increases were duplicated in other sectors and areas with less buoyant demand is itself a reflection of some nonmarket force. Although Mills is persuasive in arguing the lack of concrete evidence attesting to growing union power, the economic and structural factors he cites do not seem sufficient to explain settlements providing for annual increases reaching 20% by the time controls were imposed.

In fairness, attacking any explanation of a complex phenomenon is much easier than offering alternatives, and Mills has performed a real service in demonstrating how a confluence of events can initiate a wage spiral. Manifestly, union power alone does not explain the developments of 1967-71; otherwise how does one account for the relatively moderate increases through 1966? But collective bargaining in construction does seem to impose an expansionary bias on wage movements. Moreover, to the extent that there is an interaction effect which goes beyond the sum of market and power factors, so that union power itself is exploited more aggressively during an economic expansion (and as a corollary is underexploited during periods of stability), the mechanics and causes of this effect remain obscure.

The causes of the secular growth of the differential between wages in construction and those in other industries are likewise imperfectly understood. The relative importance of market conditions and institutional (union) power in construction, as elsewhere, will probably never be definitely resolved. At the same time, there is evidence that some of the factors frequently adduced by union leaders do not sufficiently account for wage movements in construction in the past 25 years. Although it is true that such conditions as the high proportion of skilled workers in construction, the absence or rarity of certain fringe benefits common in other industries, the uncertainty of work opportunity, and the general arduousness and hazards

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of building work should be expected, ceteris paribus, to result in higher wages, it does not follow that the differences should be as great as they are.

Furthermore, even to the extent that these factors constitute disadvantages to the construction worker, it is difficult to argue that the disadvantages have been exacerbated over time.[33] Although skill mix is difficult to measure precisely, construction skill levels apparently have not grown faster than those in, say, manufacturing. Moreover, nonwage benefits have been growing at a faster pace in construction than elsewhere, and construction seasonality, if anything, has declined slightly since World War II. Yet the differential between construction and other wages has not only been maintained during this period; it has steadily expanded. In short, even if the factors mentioned do justify higher wages in construction, they do not explain the faster *rate* of wage increases in the industry. Finally, the fragmentary evidence available suggests that there is a substantial wage differential between union and nonunion construction which, if anything, has grown in the last two decades, a condition seemingly at odds with any "market" explanation of the wage patterns described here, particularly in the absence of concrete indications that union size and power have risen commensurately.[34]

Conclusion

The issues discussed in the foregoing pages may raise in the minds of some readers the question of whether I have set up a series of straw men to be knocked down with unwarranted pomp and circumstance. Those who are familiar with the literature on this subject will discover little new in what I have said.

At the same time, teachers of industrial relations may well perceive similarities between those elements of popular wisdom I have challenged and points commonly raised by students in class discussion. This, at least, has been my experience. To the extent that students and others rely on newspaper editorials and expressions of "what everybody knows" for their understanding of labor in construction, they are apt to be misinformed. Systematic research has made appreciable strides in unraveling the complexities of the industrial relations system in construction. A good deal more remains to be done, but perhaps a more important priority is to get what is already known into the popular wisdom.

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[33] For a discussion of these points, see Howard G. Foster, "Wages in Construction: Examining the Arguments," *Industrial Relations*, 11 (October, 1972).

[34] See Howard G. Foster, "The Labor Market in Nonunion Construction," *Industrial and Labor Relations Review*, 26 (July, 1972).

PHILLIPS CURVES AND THE SECONDARY LABOR FORCE: THE COSTS OF UNBALANCED LABOR MARKETS

Allan G. King

Introduction

In his 1960 article, Lipsey[1] suggested that the aggregate relationship between unemployment and the rate of change in money wages might usefully be regarded as deriving from Phillips relationships existing in micro labor markets. Relying on this hypothesis and noting the dispersion in unemployment among labor markets, Lipsey proceeded to rationalize the elliptical path traced out by wage changes and unemployment over the business cycle. While the Lipsey hypothesis remained dormant for nearly a decade, it has recently been revived by economists interested in explaining the recent inflation in the United States and the apparent worsening of the unemployment-inflation trade-off.[2] While these efforts have apparently been quite successful, the foundation on which they rest, the micro Phillips relation, remains largely unexplored.[3] This paper attempts to estimate these relations more directly, to provide further evidence of the inflationary consequences of labor market imbalance or unemployment dispersion, and to suggest the allocation of unemployment that will minimize inflation.

According to Lipsey, in each labor market there exists a positive relationship between the level of excess demand and the rate of increase in wages. In illustrating this argument, he asserts that the relationship is linear. The assumption of nonlinearity is introduced by identifying the unemployment rate (u) as a proxy for (negative) excess demand, and noting that these variables are likely to be related nonlinearly. Thus a linear rela-

[1] Richard G. Lipsey, "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1862-1957: A Further Analysis," *Economica*, N.S. 27 (February, 1960).

[2] G. C. Archibald, "The Phillips Curve and the Distribution of Unemployment," *American Economic Review*, 59 (May, 1969), 124-134; R. J. Gordon, "Inflation in Recession and Recovery," *Brookings Papers on Economic Activity*, 1 (1971), 105-158; and G. L. Perry, "The Changing Structure of Labor Markets," (1970), 411-441.

[3] For an analysis of the Phillips relationship across cities and industries, see William P. Albrecht, Jr., "The Relationship Between Wage Changes and Unemployment in Metropolitan and Industrial Labor Markets," *Yale Economic Essays*, 6 (Fall, 1966), 279-341.

tionship between the rate of wage increase (w) and excess demand is transformed into a nonlinear one between w and u.[4]

The consequences of this hypothesis assumption are illustrated in Figure 1. Consider an economy composed of two labor markets. If it is assumed

FIGURE 1

THE PHILLIPS CURVE WITH SEGMENTED MARKETS
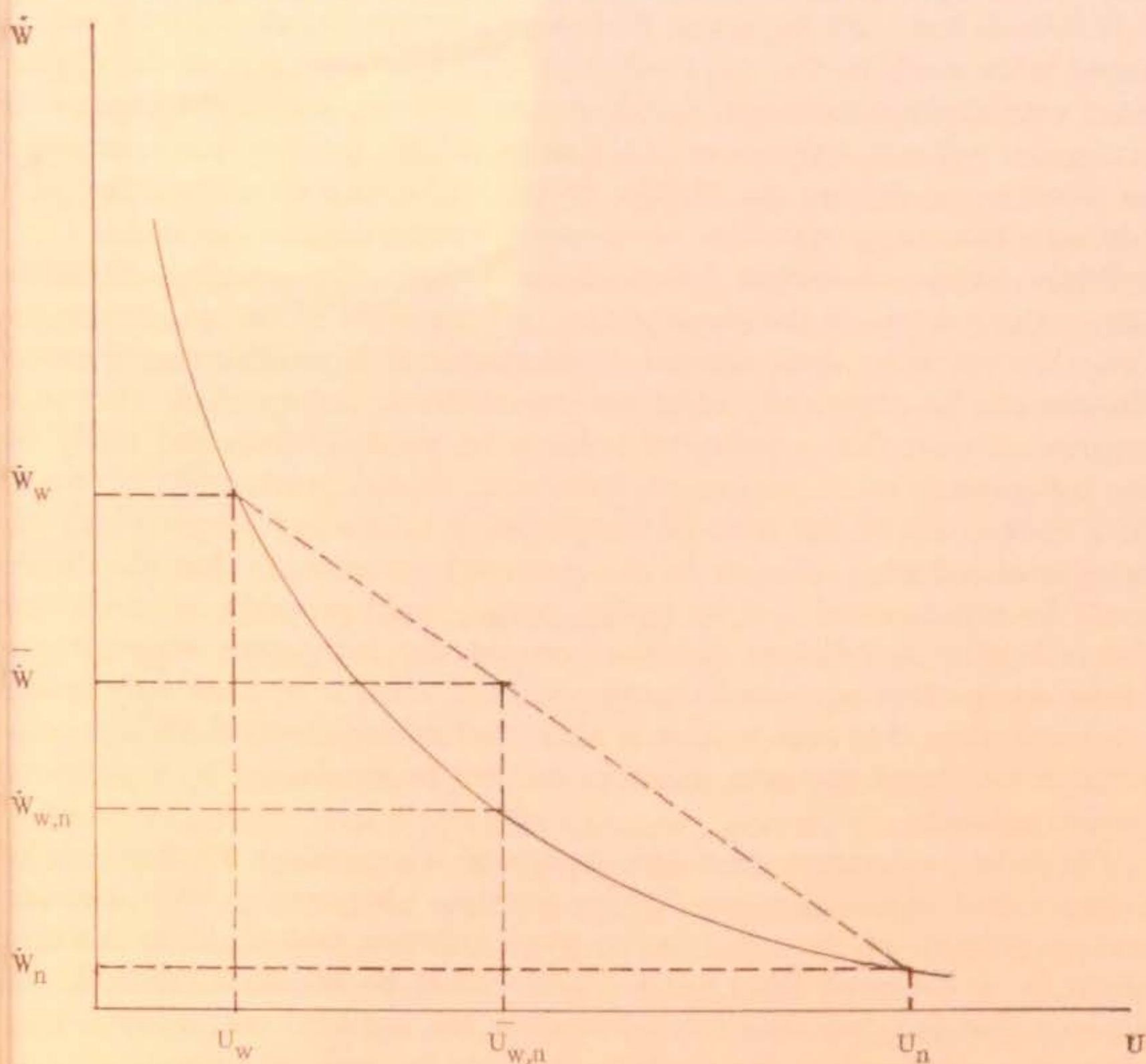
that wages respond to excess demand identically in each market, then both markets can be represented on the same graph. Let u_w denote the unemployment rate among whites and u_n the unemployment rate among nonwhites (the justification for classifying markets by race will be discussed be-

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[4] Note that the nonlinearity assumption is unnecessary to obtain the result that there are costs to unbalanced labor markets. The conclusion is consistent with linear relationships as well, provided the slopes differ among markets.

low). Since the average rate of wage increase for the economy is a weighted average of the wage increases occurring in each market (the weights being the fraction of the labor force in each market), the economy-wide rate of wage inflation must be greater than that predicted by the micro Phillips curve. An exception will occur only when the unemployment rate is the same in each market. Stated differently, the rate of wage increase associated with any average level of unemployment is minimized when unemployment is equal in both markets (u_w, n).

It follows from this argument that there are costs associated with unbalanced labor markets—the extra wage inflation that results from the dispersion in unemployment rates. Based on this analysis, one might argue that manpower policies designed to facilitate movement between markets would be effective in shifting the Phillips curve in the southwest direction, permitting a lower aggregate rate of unemployment with less inflation.

While these conclusions follow logically from the assumptions made above, the validity of the assumptions, and therefore of the policy conclusions, has yet to be demonstrated. Furthermore, it is possible that the conclusions can be empirically valid yet quantitatively unimportant. That is, a recommendation that a policy of balance be pursued, premised solely on the inflationary consequences of imbalance, would presumably be based on a comparison of the costs of the proposed manpower program and the benefits of reducing inflation by the projected percentage. Thus the theory could be corroborated and yet policy makers could properly conclude that the reduction in inflation did not warrant the manpower expenditures. Moreover, perfect equality in unemployment rates is optimal only under the assumption that each market is characterized by identical Phillips relations. If this is not the case, inflation will not be minimized by a policy of perfect balance.

The following sections treat two aspects of this problem. First, it will be assumed that identical micro Phillips relations characterize both markets, and an estimate of the reduction in wage inflation that could be brought about by a balanced labor market policy will be obtained. Second, the premise that the dynamics in each market are identical will be tested by estimating relationships for markets classified by race and sex.

A Priori Considerations

The common equation of the micro labor markets can be inferred from the aggregate Phillips relation. Consider the following model. The aggregate Phillips equation is frequently specified as

$$(1) \quad \dot{w} = b_0 + b_1 u^{-1} + e,$$

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where $\dot{w}$ and u are as defined above, and e is an error term with the usual properties. By assumption $\dot{w} = a\dot{w}_w + (1 - a)\dot{w}_n$, where a represents the proportion of the labor force working in market w. Denote the micro relations as

$$(2) \quad \dot{w}_{w,n} = a_0 + a_1 u_{w,n}^{-1} + f_{w,n}$$

It follows that the aggregate relation can be written in terms of equation (2) notation, giving us

$$(3) \quad \dot{w} = a_0 + a_1 [\alpha u_w^{-1} + (1 - \alpha) u_n^{-1}] + f.$$

Comparing equations (1) and (3), one should note that they differ in the right-hand variable: in the first equation, the independent variable is $1/E(u)$, while in equation (3) it is $E(1/u)$. In general, these terms will not be equal (Jensen's inequality).

While $b_1 > a_1$, it is possible to derive a_1, the slope coefficient in the micro relation, from b_1, the aggregate estimate. Assuming unemployment rates remain in the same ratio between markets, we have

$$(4) \quad b_1 \frac{1}{E(u)} = a_1 E\left[\frac{1}{u}\right].$$

In our model $E(u) = au_w + (1 - a)u_n$, while $1/E(u) = a/u_w + (1 - \alpha)/u_n$. Thus,

$$(5) \quad \frac{a_1}{b_1} = \frac{\dfrac{1}{\alpha u_w + (1 - \alpha) u_n}}{\dfrac{\alpha}{u_w} + \dfrac{(1 - \alpha)}{u_n}}.$$

The gains from balancing unemployment between markets can be approximated by substituting the appropriate values of the variables into equation (5). Historically, white unemployment rates have been around one-half the unemployment rate among nonwhites. If we approximate the nonwhite fraction of the labor force as being .2, then equation (5) indicates that b_1 is roughly 8% greater than a_1.[5] With an economy experiencing a rate

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[5] This result is obtained as follows. We have that

$$\frac{a_1}{b_1} = \frac{\dfrac{1}{E(u)}}{E\dfrac{1}{u}} = \frac{\dfrac{1}{\alpha u_w + (1 - \alpha) u_{nw}}}{\dfrac{\alpha}{u_n} + \dfrac{1 - \alpha}{u_{nw}}}.$$

Substituting the approximations $\alpha = .8$ and $u_{nw} = 2u_w$ gives $a_1/b_1 = 1/1.08$. Multiplying the 4% inflation rate by .08 gives the estimate of .32.

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of inflation of 4% annually, the implied slowdown in the rate of inflation is only .3% per year, assuming wages are rigid downward. Clearly the argument for balanced labor markets as an anti-inflation policy must run in terms of variations in the Phillips curve among markets.

Let us consider why the wage-unemployment dynamics may vary among markets. One view has it that secondary labor markets[6] are likely to adjust to excess demand through quantity changes rather than wage adjustments. The implication is that the unemployment-wage inflation trade-off may be more favorable in these markets, and therefore the cost of imbalance exceeds our estimate of .3%. This argument runs as follows. In the presence of excess demand, firms can adjust: by raising wages, in an attempt to bid labor away from other firms and attract additional workers into the market; by lowering their hiring standards and accepting a higher proportion of applicants; or by a combination of these methods. Which mode of adjustment is chosen will generally depend on relative costs, which are likely to vary among markets.

Because the wage structure prevailing within a firm tends to be rather rigid, workers often have a strong sense of the "proper" wage differentials, and therefore the cost of attracting workers by increasing wages is likely to be quite high. Also, once wages are increased they become rather difficult to reduce. Thus firms might be expected to initiate wage increases only when they become convinced of the "permanent" nature of their increased demand.

Similarly, lower hiring standards impose costs on the employer. To the extent that on-the-job training is important and lower hiring standards result in the employment of less reliable or less productive workers, the employer can expect lower returns on his investment in his labor force, since workers are now likely to remain in his employ for shorter periods of time or produce less while they work. Obviously, if the expected duration of the increased demand for labor is short, little training is likely to occur, and the employer need not consider the possibility of incurring a capital loss.

The implication of this discussion is that the manner in which an employer is likely to adjust to any particular market situation will depend to a considerable extent on its expected duration. The longer the time perspective, the smaller do the wage costs appear relative to the costs of increasing employment instability, a probable result of lower hiring standards. On the other hand, a wage increase that is likely to be permanent in nature is

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6 This term derives from the work of P. B. Doeringer and M. J. Piore, *Internal Labor Markets and Manpower Analysis* (Lexington: D. C. Heath, 1972), which summarizes the literature on dual labor markets. As Gordon notes, the secondary labor market refers to characteristics of jobs rather than workers. The primary market is characterized by high wages and stability of employment, the secondary market by low wages and unstable employment.

an extremely costly way of adjusting to a temporary market imbalance. If we make the assumption that employers distinguish between workers hired to fill permanent jobs and those hired to meet transitory needs, then this analysis implies that the adjustment mechanism in the first market will be primarily the wage rate, while in the second market wages will remain relatively constant and adjustment will occur through hiring standards.

This dichotomy is, in essence, the dual labor market hypothesis. The primary market is characterized by high wages and employment stability; the secondary market, by low wages and high turnover. Noting the propensity of employers to screen on the basis of race and sex, we can identify white males with the primary labor market, and nonwhite males and white and nonwhite females with the secondary labor market.

Although Doeringer and Piore[7] emphasize the importance of on-the-job training in explaining the marginal employment status of the latter group, Kosters and Welch,[8] while attesting to this marginality, relate it to the existence of minimum wage laws. In terms of the model estimated in this paper, the implication of both schools of thought is that excess demand is likely to cause wages to increase principally in the primary labor market. In secondary markets, wage increases are likely to be less dependent on the level of unemployment.

In contrast to these theoretical expectations, recent empirical evidence can be interpreted to support that contrary view that the inflation-unemployment trade-off is *less* favorable in secondary markets. For example, Wachter[9] reports that low wage earners experience a relatively greater increase in wages at low levels of unemployment than do more highly paid workers. Also, the observation that wage structures compress during the expansionary phase of the business cycle, and the suggestion that this compression occurs at the bottom of the job hierarchy,[10] constitute further inferential evidence of a steeply sloping Phillips curve in secondary markets.

With theoretical and empirical considerations supporting each side of this issue, we turn next to the estimates of the micro relationships.

The Data

In estimating the Phillips relation, the dependent variable is usually specified as the rate of change in average hourly earnings. Unfortunately,

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[7] Doeringer and Piore, op. cit.

[8] M. Kosters and F. Welch, "The Effects of Minimum Wages on the Distribution of Changes in Aggregate Employment," *American Economic Review*, 62:3 (June, 1972), 323-332.

[9] M. L. Wachter, "Cyclical Variation in the Interindustry Wage Structure," *American Economic Review*, 60:1 (March, 1970), 75-84.

[10] M. W. Reder, "The Theory of Occupational Wage Differentials," *American Economic Review* (December, 1955), 833-852.

these data are not available by race or sex. Instead, the dependent variable used in this study is the annual rate of change in the wage and salary income of full-time workers, available in the P-60 series of the *Current Population Reports*.[11]

Clearly the rates of increase in hourly wages and income can differ. The income series is likely to be much more sensitive to variations in hours of work—a worker may double his income by working overtime, but this will not result in a doubling of his average rate of pay. In addition, the wage and income series may differ because the census reports incomes of all full-time workers over 16 years of age, while the establishment data, from which average hourly earnings are calculated, are restricted to private nonfarm employment. These differences between the series should be borne in mind in evaluating the results presented below.

Empirical Findings

Table 1 presents the estimated coefficients obtained in the regression of the annual rate of change in wage and salary income on the inverse of the unemployment rate. Separate regressions were estimated for white males, nonwhite males, white females, and nonwhite females. The validity of the hypotheses discussed above can be evaluated by examining the estimated

Table 1

THE RELATION BETWEEN UNEMPLOYMENT AND THE RATE OF
INCREASE IN WAGE AND SALARY INCOME: 1956-1967

Group	Constant	U-1	R^2	D.W.	ESS
White males	2.29°	8.33°	.42	1.29	4.55
	(2.86)a	(2.70)			
Nonwhite males	-1.38	58.46°	.38	1.76	56.93
	(-.51)	2.49			
White females	-2.67	31.88°	.56	.90	7.19
	(-1.51)	(3.56)			
Nonwhite females	-11.43	169.39°	.31	1.42	147.77
	(-1.37)	2.14			

Sources: Income data: U.S. Bureau of the Census, *Current Population Reports*, Series P-60, No. 69, "Income Growth Rates in 1939 to 1968 for Persons by Occupation and Industry Groups, for the United States," Tables 15 and 16; Unemployment data: Bureau of Labor Statistics, *Handbook of Labor Statistics 1971*, Table 63.

a T values are in parentheses.

° Coefficient is significant at the .05 level.

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[11] U.S. Bureau of the Census, *Current Population Reports*, Series P-60, No. 69, "Income Growth Rates in 1939 to 1968 for Persons by Occupation and Industry Groups, for the United States (Washington, D.C.: U.S. Government Printing Office, 1970). Data for the period 1955-67 were taken from Tables 15 and 16.

slope coefficients of the four equations. The statistics in Table 1 indicate that each of these coefficients is significantly different from zero, and that the smallest slope coefficient appears in the equation for white males—the primary labor market group. This result implies that at a given level of unemployment, wages will increase more slowly in this market than in any of the secondary markets.

The results appearing in Table 2 are useful in evaluating the statistical significance of the differences in the slopes of the curves estimated for the primary and secondary markets. The test employed is that recommended by Johnston.[12] Testing each of the secondary groups against white males indicates that in each instance the slope coefficient for white males is significantly smaller.

This finding need not imply that a more equitable distribution of unemployment will increase upward pressure on prices. This judgment must be based on a comparison of relative slopes, in the $\dot{w}$-u plane, at current levels of unemployment. Because of the nonlinearity of the Phillips curve, the outcome of this comparison will depend on the initial distribution of unemployment among markets. The slope of the Phillips curve in the ith market, dw_i/du_i, is given by a_{1i}/u^2_i. If a_{1wm} denotes the slope coefficient in the equation for white males, and u_{wm} denotes this group's unemployment, then the condition that must be satisfied to make a redistribution of unemployment towards white males profitable in terms of inflation fighting is

(6) $a_{1wm}/a_{1i} > u^2_{wm}/u^2_i$ for some i.

During the period of observation, the unemployment rate for white males averaged 4.2%. For white females and nonwhite males and females, unemployment rates were 5.2, 9.5, and 9.8%, respectively. Combining these averages with the estimated coefficients in Table 1, we find that the above inequality is not satisfied by any of the secondary groups. Indeed, if these results are taken literally, they imply that wage inflation could be reduced by transferring more unemployment to what we have referred to as secondary labor markets. This policy is not advocated in this paper; the data presented above merely indicate that a redistribution of unemployment cannot be justified by an appeal to anti-inflationary policy.

The objection might be raised that the equations specified in Table 1 overstate the costs of reducing unemployment in secondary markets. However, implicit in these equations is the assumption that these markets function independently of each other; that is, there are no spillover effects among markets. If this is not the case, and the rate of wage increase in each market depends not only on its own unemployment rate but on the state of the aggregate labor market as well, then the coefficients reported in Table 1

12 J. Johnston, *Econometric Methods*, 2nd ed. (New York: McGraw-Hill, 1972), 192-207.

Table 2

REGRESSIONS OF SECONDARY GROUPS POOLED WITH WHITE MALES[a]

Group	Constant	U-1	Secondary Dummy	R²	D.W.	ESS
White females	−78.75	.09	−2.49	.47	1.36	14.72
	(−1.35)[b]	(1.36)	(−.21)			
Nonwhite males	−27.34	.04	−10.49	.06	1.52	96.91
	(−.97)	(1.29)	(−.84)			
Nonwhite females	23.39	−.02	3.63	.05	1.13	231.47
	(1.14)	(−.85)	(.29)			

Sources: Same as Table 1.

[a] If ESS_{wm} denotes the error sum of squares for white males from Table 1, and ESS_i is similarly defined for the ith secondary group, and $ESS_{wm, i}$ is the error sum of squares from the pooled regressions reported above, then the hypothesis that the slope coefficients are identical between groups i and wm can be evaluated by the following F statistic:

$$F(1,20) = \frac{ESS_{i,wm} - (ESS_i + ESS_{wm})}{ESS_i + ESS_{wm}/20}.$$

For the derivation see Johnston, op. cit. The calculated values of F for the pairings noted above are 30.7, 5.08, and 10.30, all of which are significant at the .05 level.

[b] T values are in parentheses.

will be biased upward. Moreover, it is likely that the bias will affect the secondary labor markets most strongly, since over the business cycle the variance in unemployment is greatest within these groups.

The validity of this argument was investigated through the equations reported in Table 3. The coefficient on the own-unemployment term tells us the effect of lowering the unemployment rate in this market while keeping the aggregate level of unemployment constant. Unfortunately, the results

Table 3

ESTIMATED PHILLIPS RELATION WHEN AGGREGATE
UNEMPLOYMENT IS INCLUDED

Group	Constant	U-1	Agg U-1	R²	D.W.
White males	1.36	−3.03	18.66	.45	1.56
	(.90)[a]	(−.19)	(.72)		
Nonwhite males	−5.64	−31.31	70.29	.46	1.69
	(−1.24)	(−.39)	(1.15)		
White females	−.17	(−25.03)	42.57[*]	.82	1.57
	(−.13)	(−1.50)	(3.65)		
Nonwhite females	−10.95	82.82	42.03	.38	1.49
	(−1.32)	(.71)	(1.00)		

Sources: See Table 1.

[a] T values are in parentheses.

[*] Coefficient is significant at the .05 level.

of this test are inconclusive. Because of the small number of observations and the high correlation between the independent variables,[13] the coefficients cannot be estimated accurately. As indicated, only one significant coefficient appears in the entire table.

Conclusion

The finding that a redistribution of unemployment will have no impact on inflation should be interpreted cautiously, for it is at variance with a considerable body of indirect evidence, both theoretical and empirical. Empirically, these findings contradict the results of Archibald,[14] Perry,[15] and Gordon,[16] who find that the dispersion in unemployment contributes significantly to wage and price inflation. Since dispersion in unemployment rates usually results from a relatively greater increase in unemployment among the secondary labor force groups, our findings would predict a negative sign for this variable. In addition, Perry and Gordon employ a weighted unemployment variable to reflect their assumption that a reduction of unemployment in the market for prime age males should generate more pressure on wages than would a decline in unemployment among other labor force groups. Their results are consistent with this line of reasoning as well.

In related work, Leigh[17] has defined micro labor markets along occupational lines. Focusing on the six occupational groups to which he thinks secondary workers can aspire in the short run, he regresses the unemployment rate on the wage rate lagged one period (observations are monthly). He finds this relationship to be insignificant for five of the six occupational groups. However, the relevance of this work to the present study may be discounted because of differences in the specification of the models. Leigh relates unemployment to the *levels* of wage changes, while the Phillips equation correlated unemployment with the rate of change in wages. It would be of interest to learn how Leigh's data would respond to the Phillips specification.

A bit of evidence in support of our results is the finding that the counterclockwise ellipses that Lipsey found traced out by the British data have been observed to follow a clockwise path in the United States.[18] Although

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[13] The independent variables in the equation are highly correlated; the correlation coefficients are .98, .96, .93, and .73, respectively.

[14] G. C. Archibald, op. cit.

[15] G. L. Perry, op. cit.

[16] R. J. Gordon, op. cit.

[17] Duane E. Leigh, "A Short-Run Analysis of the Occupational Structure of Unemployment in the United States," *Journal of Economics and Business* 25:1 (Fall, 1972), 32-38.

[18] C. C. Holt, et al., *The Unemployment-Inflation Dilemma: A Manpower Solution* (Washington: The Urban Institute, 1970).

other explanations have been offered for this phenomenon, Lipsey's hypothesis that the dispersion in unemployment increases during an economic expansion implies, given our results, that the short-run Phillips curve is more elastic than the long-run relationship, a frequently reported result of analysis with U.S. data.

EVIDENCE ON THE PHYSICIAN SHORTAGE

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Introduction

Repeated references to a "crisis" in the delivery of health care have been aggravated in recent years by the rapidly rising prices of health care and by the political debate over a national health insurance system. Central to any debate over the basic causes or ultimate resolution of the crisis in delivery is the critical role of health manpower. Despite the fact that health manpower resources have expanded rapidly since 1950 (see Table 1), the Carnegie Commission Report on Higher Education and the Nation's Health observed:

. . . the most serious shortage of professional personnel in any major occupational group in the United States is in health services (21, p. 13).

This assertion about health manpower shortages, like so many before it, is

Table 1

EMPLOYMENT GROWTH IN SELECTED HEALTH MANPOWER OCCUPATIONS, 1950, 1960, AND PROJECTIONS TO 1970

Ocupation	1950 Total	1960 Total	1970 Total	Percent Change 50-60	Percent Change 60-70
M.D.'s and D.O.'s	178,709	222,567	298,573	+ 24.5	+ 34.0
Psychiatrists and neurologists	5,341	11,185	28,342	+109.5	+153.5
Dentists	68,670	86,887	119,191	+ 26.5	+ 37.0
Pharmacists	84,480	92,233	104,094	+ 9.0	+ 12.5
Registered nurses	403,470	581,289	940,537	+ 44.5	+ 62.0
Licensed practical nurses	134,010	207,966	368,765	+ 55.0	+ 77.0

Table constructed from sources developed by Irene Butter, "Health Manpower Research: A Survey," *Inquiry*, 4 (December, 1967), 6-7.

made in spite of a rather serious debate about the extent and/or the type of shortage at hand.

There is no doubt that the geographic distribution of active physicians and physicians' services is uneven or that large segments of American society go without medical care, but the Carnegie group's report of shortages is linked mainly to a statement made by Dr. Roger Egeberg and not in any empirical way to these arguments (23, p. 7). Dr. Egeberg said that today the United States needs about 50,000 more physicians, ". . . a couple of hundred thousand more nurses," and ". . . about 150,000 more technicians" (9, p. 73). Accepting the existence of a shortage of some magnitude, the Carnegie Commission set out a number of national goals to be achieved by 1980, such as expanding the functions of university health science centers, developing and expanding programs for physicians' and dentists' assistants and associates, accelerating medical and dental school education, integrating curricula, initiating nine new university health science centers, and so on (21, p. 99).

The central figure in the delivery of health care always has been the physician, and he will continue to be the keystone of care. In light of his central role in the delivery process, public decision makers have often reacted to cries of the existence of a shortage of physicians. What evidence is there of a past or present aggregate shortage of physicians? Will there be a future shortage? Is the shortage really just a problem of maldistribution of physicians geographically or of inappropriate allocation of physician activities among all allied health personnel? This paper will review the literature of past and more recent studies of physican shortages and will assemble the various methodologies and results of completed studies to date. Hopefully this review will alert decision makers to the wide and sometimes contradictory findings on which they are expected to base their decisions regarding health manpower.

During the past several years a number of excellent health manpower studies have been completed. But the Carnegie position on physician shortages may have had a relatively greater impact on the public than most of the other papers. The reader is reminded of Butter's (8) 1967 and Hiestand's (20) 1966 health manpower literature reviews and of Yett's *The Development of a Micro-Simulation Model of Health Manpower Demand and Supply* (56). The latter is an excellent piece of research in its own right and contains an excellent bibliography of health manpower research items.

What Is Meant by a Health Manpower Shortage?

The health literature contains at least three definitions of manpower shortage, and as the definition of "shortage" changes, so does the question of its *existence* and/or *magnitude*. First, and probably most frequently, the term "shortage" has been used in a *normative sense*. Here a "shortage" is the

measured present or estimated future gap between the quantity of health manpower "needed" and the quantity "supplied," where "need" is based on some qualitative or quantitative standards which usually are not specified (*24; 20*, p. 152; *11*, pp. 6-22; *6*, pp. 8-9). Such a working definition has been popular with health planners. For example, in 1953 the National Manpower Council was worried about the shortage of physicians in rural America. "Shortage," in this instance, represented the difference between what the demand for health services (and hence physicians) was, and what the council thought it *ought to be* in 1953 (*35*, p. 233). Today the same question of shortage might be rephrased to ask whether the geographic distribution of health manpower was appropriate and in particular whether physicians were "properly" allocating their services.

Another illustrative case of a normative shortage was the 1959 Bane report, fully entitled *Physicians for a Growing America: A Report of the Surgeon General's Consultant Group on Medical Education* (*4*). The Bane report projected a shortage of between 11,600 and 17,200 physicians by 1975. This conclusion was derived from two separate projections. The 1975 supply projection was based on mortality and retirement data for physicians and on estimates of the annual output of new graduates. The 1975 requirements projection was based solely on the 1959 physician-to-population ratio which was adopted as the standard. Given the projected population for 1975, the number of physicians "needed" or "required" was determined by applying the criterion ratio. The difference between projected requirements and supplies was the estimated shortage. The Bane report, like others, assumed that the 1959 ratio of physicians to population represented a "minimum adequate standard"; however, it did not establish the basis for determining adequacy.

Still another instance of a projected shortage based upon a normative judgment was that made by the Surgeon General's Consultant Group in Nursing (*52*). The Surgeon General's group first considered the growth of health care institutions that employed nurses, then proceeded to make a value judgment about the proportion of patient care that must be rendered by the professional nurse. From these two steps, the Consultant Group determined the number of professional nurses required by 1970 to provide "adequate" nursing services in general hospitals. In this case a value judgment was made about the nature of the health services production function, that is, the bed-nurse ratio required to produce "adequate" nursing services.

The second definition of the term "shortage" might be thought of as an economist's redefinition of the need criterion. To an economist, a "labor shortage" does not mean that additional manpower is "needed" to satisfy some standard or goal. Usually, he would state that a shortage refers to an excess of demand over supply at a specified price, ceteris paribus (*31*, pp. 332-334). Under perfectly competitive conditions, if a "shortage" existed, it

would automatically work itself out through time via adjustments in prices (24; 20, p. 153; 16, p. 104). It is possible, however, that such a "shortage" could exist even over the distant horizon if monopsonistic pressures or other market imperfections prevented wages from rising (24; 20, pp. 153-154; 55).

With the competitive case in mind, Elton Rayack analyzed the market for physicians' services (44). In his study, Rayack used *relative* earnings data for different times as an index of physician shortages. Following Blank and Stigler's (5) methodology, he operationalized the Marshallian definition of a "shortage" in the following way:

. . . a shortage exists when the quantity of physicians' services supplied increases less rapidly than the quantity demanded at incomes received by physicians in the recent past. Under such conditions, the incomes of physicians relative to the incomes of others will tend to rise. As the relative income of physicians rises, there will be attempts to substitute less costly services for the services of physicians (44, p. 222).

The case of a monopsonistic or oligopsonistic buyer of nursing services might be a good illustration of the above-mentioned market imperfections. In this instance, a shortage could persist over time if local hospitals combined to hold wages at some predetermined level and thus prevented the market from clearing via automatic wage adjustments (55, p. 91). But, of course, market imperfection could also exist with respect to *entry* into an occupation. However, a point we will make at the end of this section is that barriers to entry should not prevent the market from clearing in the above-used Marshallian sense. To account for market imperfections other than barriers to entry, such as a lag in the adjustment of supply and price to steady upward shifts in the demand schedule over time, Arrow and Capron have introduced the idea of a "dynamic shortage" (3). The Arrow-Capron definition of a labor shortage has not been applied to physician markets; however, it has been used to analyze shortages in nursing labor markets (55). This shortage is dynamic in two respects: it recognizes that there will be time lags in both the employer's and the worker's responses to shifts in demand or supply; and it is adaptable to the situation in which the demand for labor is continuously increasing over time.

The third way in which the term "shortage" has been used is to indicate a situation in which human resources are not optimally allocated among various occupations. Friedman and Kuznets popularized this definition (12) when comparing earnings between physicians and dentists after taking account of differences in the total costs of education between the two occupations. They computed the present discounted value of the income stream minus the present discounted value of the cost of education stream for physicians and dentists and discovered that the net present value of the former exceeded the latter. The authors concluded, therefore, that a short-

age of physicians existed vis a vis dentists and that its persistence arose from the difficulty of entry into medicine, a phenomenon resulting in a misallocation of resources between the two occupations. In the absence of barriers to entry into medicine, Friedman and Kuznets believed that there would have been a greater number of practicing physicians and that their average income would have been lower. Accordingly, they reasoned, a fall in the relative income of physicians would have tended to equate the net present value of the returns to the alternative investments in medical and dental education.

The findings based on this approach have been soundly criticized on the grounds that the rate of discount used in computing net present values can affect the outcome (30). That is, the secular configuration of the contrasted net income streams which are discounted to the present may be significantly different. The higher the rate of discount, for instance, the more important the return occurring during the early years of each stream in determining present value. To avoid this problem, but still viewing education as a type of investment which yields a flow of money returns, Hansen has computed internal rates of returns for physicians, dentists, and male college graduates (17). This methodology involves the estimation of the rate of discount at which the present discounted value of the income stream minus the cost stream equals zero. By comparing physicians' internal rates of return at different times with those of some reference equilibrium internal rates, one can determine whether a shortage or surplus exists and in which direction this condition is changing.

Before turning to a discussion of the results of the various studies of physician shortages, it is appropriate to note that contradictory findings regarding a physician shortage could result between the relative earnings and the rate-of-return approach to analyzing the shortage problem. To simplify matters, assume the absence of nonpecuniary differences in the training for and practice of medicine and dentistry, and assume both professions have identical total cost of education streams. If the level of demand in the market for physicians (Figure 1) and in the market for dentists (Figure 2) is such that both sectors have equal market clearing wages (i.e., $W^1_P = W^1_D$), then neither the relative income nor the internal rate-of-return approach will suggest a shortage of physicians relative to dentists. A shift in the demand for physicians relative to dentists from, say, D_1 to D_2 in Figure 1 will evoke forces resulting in a wage increase for physicians from W^1_P to W^2_P. Immediately following the increase in demand for M.D.'s —as physicians' earnings rise relative to dentists' earnings—both approaches will conclude that a physician shortage exists. However, when the price adjustment is completed and relative earnings are stable, the relative income approach would conclude that no shortage exists in the sense of an

excess of demand over supply, whereas it is possible (e.g., with barriers to entry) for the shortage to persist according to the internal rate-of-return approach.
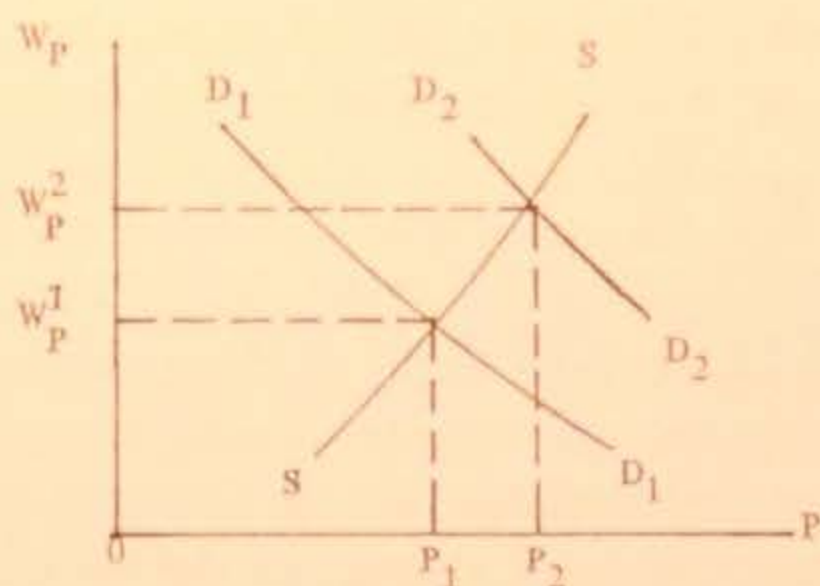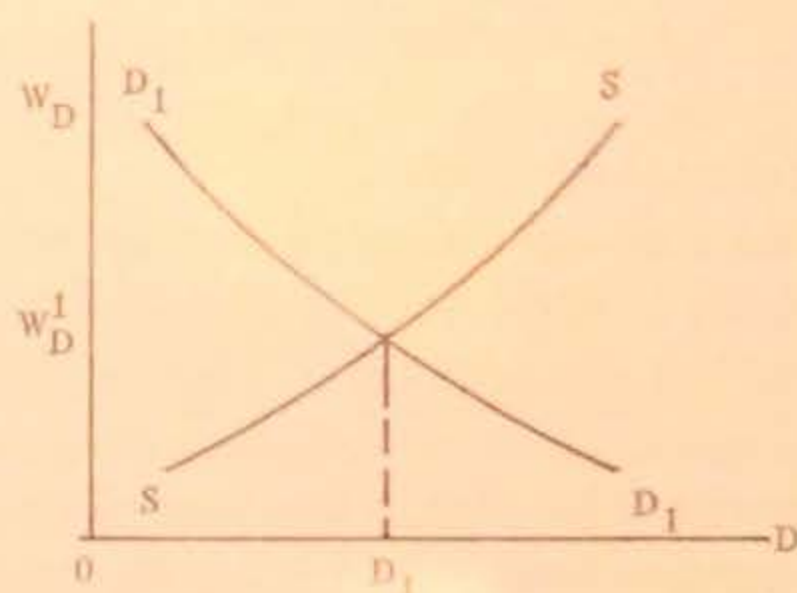
Figure 1	Figure 2

Methodologies of Estimating Shortages

Based upon these three definitions of shortage, there have been a number of techniques used to determine present manpower shortages or to predict future shortages. We turn now to a critical review of these methodologies and to a comparison of their results.

A survey of physician-to-population studies

The Lee-Jones study of 1932 is the earliest attempt to quantitatively estimate the "need" for physicians in the United States (29). This study quantified "need" for physicians by proceeding as follows:

(a) developing a table of annual "expectancy rates for diseases and injuries";

(b) canvassing leading physicians regarding their opinion of the number of services required to diagnose and treat given illnesses;

(c) estimating the number of physician hours required to furnish care for each major disease and injury category; and

(d) assuming that the average physician spends 2,000 hours per year in caring for patients.

They were able to translate requirements for physicians' hours into a "need" of 165,000 physicians, using this assumption.

The findings of several other studies which, by and large, use the normative approach in projecting physician supplies and requirements for the years 1960, 1970, and 1975 are presented in Tables 2, 3, and 4, respectively. Following a procedure established by Hansen (16, p. 110) and using his differences when possible, Table 5 presents the estimates of projected shortages implied by each study which reported both projected supplies and requirements.

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All three of the studies in Table 2 used the physician-to-population ratio methodology for estimating physician requirements for 1960. Focusing first on the estimates of projected supplies, one notes that as the 1960 target date was approached, the projected 1960 supply figures tended to improve vis a vis the actual number of physicians in 1960. Thus the closer the date of the projection to 1960, the more accurate the estimate. In making this point, Butter observed that it would have been helpful to explain why the studies —but primarily the earlier ones—were so far off the market (8, pp. 15-16). Such an explanation, however, is impossible, since the 1949 study of Mountin, Pennell, and Berger (32) was the only one of the three studies to stipulate how supply projections were arrived at. This analytical limitation does not characterize the remaining studies which made projected supply estimates.

The Ewing study (10) was the first to use the physician-to-population ratio approach per se in projecting physician requirements. In this case, to illustrate the use of this method, the study applied

. . . an entirely realistic standard, based on levels of manpower already attained by our own country by the twelve states at the top of the ladder (10, pp. 29-31).

Here the standard physician-to-population ratio was computed by averaging the physician-to-population ratios of the 12 states with the highest ratios. Then this standard was used to determine the need for physicians in 1960 by applying it to the predicted population of the United States in 1960. Comparing projected 1960 physician needs with the projected 1960 physician supplies, the Ewing study estimated a shortage of some 42,000 active M.D.'s by 1960 (see Table 5). Based on these procedures and subsequent results, the report recommended that the federal government finance the nation's health needs by creating a national insurance program, building and maintaining additional hospitals, and training the needed health manpower.

Apart from the different projected physician supplies by 1960, each of the studies in Table 2 also employed a different "standard" or physician-to-population ratio. This and other differences help to explain why the projected future for physician markets differs so radically among the studies. Instead of a projected shortage of 42,000 M.D.'s by 1960 as was predicted by the Ewing study, the Mountin, et al., study projected a shortage of physicians between 17,413 and 45,053 (see Table 5). The real contrast, however, is in the results of *The President's Commission on the Health Needs of the Nation in 1952 (41)*.

The Commission made no less than six different estimates of the nation's 1960 physician requirements. The assumption (i.e., standard) underlying each, of course, was different. Table 2 presents only the set of extreme projected requirements. Referring to Table 5 we can see that the 1952

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Table 2

COMPARATIVE PROJECTIONS OF PHYSICIAN SUPPLY

AND REQUIREMENTS FOR 1960

Date of Projection	Projected Population	Projected Supply (active M.D.'s)	Projected Requirements[a] (active M.D.'s)
1948[1]	160,000,000	212,000	254,000
1949[2]	158,286,000	216,119	min 233,532
			max 261,171
1953[3]	171,176,000	222,000[b]	min 216,000
			max 281,000
Actual in 1960[4]	185,369,000	248,664	

Table constructed from sources developed by Irene Butter, "Health Manpower Research: A Survey," *Inquiry*, 4 (December, 1967), 15.

a The requirement figures for the 1948 study are based on the goal of attaining in all states the physician-population ratio of the top 25% states; similarly, for the 1949 study with the top 50% and 25% states representing the minimum and maximum figures. The minimum figure in the 1953 study is based on retaining the overall 1940 physician-population ratio of 133 per 100,000; the maximum is based on attaining the New England and Central Atlantic ratio of 1949—166 per 100,000 civilians—plus meeting increased military needs.

b This source initially contained inactive as well as active M.D.'s. However, Irene Butter adjusted the initial figure by 11,000 (the approximate number of inactive physicians in 1960) in order to make all the estimates comparable.

1 *(10)*   3 *(41)*
2 *(32)*   4 *(48)*

Presidential Commission expected anything from a deficit of 59,000 M.D.'s by 1960 to a surplus of 6,000 M.D.'s. It is important to note that, characteristically, this Commission did not explicitly choose *one standard* from the six alternatives. However, it implicitly accepted those which resulted in a projected shortage, since the Commission proceeded to recommend that federal funds be used to expand health manpower training facilities and that substantial aid be given to medical students.

The confusing picture drawn from studies of expected physician shortages or surpluses in 1960 is characteristic of more recent reports. The question, however, is: How much guidance for the direction of public policy is provided by these studies?

Table 3 presents projections of physician supplies and requirements for 1970. Projections from eight sources are presented, and as expected, there are nearly as many different estimates of projected supplies and requirements. The projected supply of M.D.'s and D.O.'s ranges from a low of 294,900 to a high of 340,000. Note, once again, the tremendous variability among the studies.

On the requirements side, the range is from a low of 276,458 to a high of

Table 3

COMPARATIVE PROJECTIONS OF PHYSICIAN SUPPLY
AND REQUIREMENTS FOR 1970

| Date of Projection | Projected Population | Projected Supply | | Projected Requirements |
		M.D. and D.O. (active & inactive)	M.D. Only	M.D. and D.O.
1958[1]	209,380,000		273,474	276,458 (a) (c)
			274,469 (a)	286,938 (b)
1959[2]	213,810,000	294,900 (d)		299,000 (f)
		296,500 (e)		
1959[3]	213,810,000		279,000 (g)	283,000 (h)
1960[4]	213,810,000		279,000 (g)	283,000 (h)
1964[5]	214,570,000	327,900 (i)		
		324,900 (j)		
		319,900 (k)		
1966[6]	212,683,000	335,000 (l)		
		340,000 (m)		
1966[7]		306,954 (n)		
		326,915 (o)		
1966[8]	208,576,000	332,700		

Table constructed from sources developed by Irene Butter, "Health Manpower Resources: A Survey," *Inquiry*, 4 (December, 1967), 16.

References to table: (a) increase of graduates of U.S. schools; (b) increase of graduates sufficient to maintain 1955 ratio of graduates to population 20-24; (c) maintaining 1955 physician-population ratio; (d) present production rate; (e) recent growth rate; (f) to maintain 1959 ratio; (g) graduates at level currently predicted; (h) increase of graduates to maintain 1957 ratio; (i) at current planned growth, increase of graduates (1,600 foreign graduates licensed annually); (j) 1,000 foreign graduates annually; (k) no foreign graduates licensed after 1965; (l) low estimates of U.S. graduates and new foreign unlicensed, stable new foreign licenciates; (m) high estimates of graduates and foreign unlicensed, stable new foreign licenciates; (n) based on HMP growth in 1950-1960, 4½% per year; (o) HMP growth rate, 5½% per year.

1 (39)   5 (19)
2 (4)   6 (47)
3 (18)   7 (56)
4 (51)   8 (11)

299,000, representing a difference of 22,542 physicians—that is, a difference whose magnitude is something like 10% of all physicians in the United States in 1960.

Table 4 presents projected physician supplies and requirements for 1975. As with the projections for 1960 and 1970, there is considerable variability among these studies in both projected supplies and projected physician requirements. As for requirements, the estimates range from a low of 301,370 to a high of 425,000 physicians by 1975. Perhaps a brief appeal to the con-

tent of Table 5 and an appraisal of the differences in projected physician "shortages" for the years 1970 and 1975 will rather quickly dilute the credence one can place in these studies.

Table 4

COMPARATIVE PROJECTIONS OF PHYSICIAN SUPPLY AND REQUIREMENTS FOR 1975

Date of Projection	Projected Population	Projected Supply M.D.'s & D.O.'s	Projected Supply M.D.'s Only	Projected Requirements M.D.'s & D.O.'s
1958[1]	228,463,000		290,409	301,370 (a) (c)
			293,382 (a)	325,139 (b)
1959[2]	235,246,000	312,800 (d)		330,000 (f)
		318,400 (e)		
1959[3]	235,246,000		296,100 (g)	311,520 (h)
1960[4]	235,246,000		296,100 (g)	339,220 (i)
1964[5]	232,221,000	356,900 (j)		
		350,900 (k)		
		340,900 (l)		
1966[6]	230,314,000	369,200 (m)		
		382,200 (n)		
1966[7]			304,000	
1967[8]				375,000
1967[9]	224,730,000	361,700 (j)		340,000–350,000 (o)
				372,000–385,000 (p)
1967[10]	223,000,000	360,000		400,000
1967[11]				390,000
1967[12]		360,000		min 346,000
1967[13]		360,000 (q)		390,000
1967[14]		360,000		400,000
				425,000
1967[15]		360,000		168,228
				226,553

Table constructed from sources developed by Irene Butter, "Health Manpower Resources: A Survey," *Inquiry*, 4 (December, 1967), 16, and by W. Lee Hansen, "An Appraisal of Physician Manpower Projections," *Inquiry*, 7 (March, 1970), 107.

References to table: (a) increase of graduates of U.S. schools; (b) increase of graduates sufficient to maintain 1955 ratio of graduates to population 22-24; (c) maintaining 1955 physician-population ratio; (d) present production rate; (e) recent growth rate; (f) to maintain 1959 ratio; (g) graduates at levels currently predicted; (h) increase of graduates to maintain 1959 ratio; (i) requirements to raise below-average states to 1957 ratio; (j) at current planned growth, increase of graduates (1,600 foreign graduates licensed annually); (k) 1,000 foreign graduates annually; (l) no foregin graduates licensed after 1965; (m) low estimates of U.S. graduates and new foreign unlicensed,

stable new foreign licenciates; (n) high estimate of graduates and foreign unlicensed, stable new foreign licenciates; (o) based on 12-15% increase due to population growth alone; (p) based on 22-26% increase due to all factors; (q) no figure is given. Hansen assumed NACHM supply figure of 360,000 is appropriate to use.

[1] (39)   [9] (11)
[2] (4)   [10] (2)
[3] (18)   [11] (46)
[4] (51)   [12] (33)
[5] (19)   [13] (53)
[6] (47)   [14] (54)
[7] (1)   [15] (49)
[8] (42)

Table 5

PROJECTED PHYSICIAN SHORTAGES FOR
1960, 1970, AND 1975

Date of Projection	Projected 1960 Deficit (−) or Surplus (+)	Projected 1970 Deficit (−) or Surplus (+)	Projected 1975 Deficit (−) or Surplus (+)
1948[1]	−42,000		
1949[2]	min −17,413		
	max −45,053		
1953[3]	+ 6,000		
	−59,000		
1958[4]		− 2,984	− 10,961
		−12,469	− 31,757
1959[5]		− 4,100	− 17,200
		− 2,500	− 11,600
1959[6]		− 4,000	− 15,400
1960[7]		− 4,000	− 43,120
1967[8]°			+ 21,700 to + 11,700
			− 10,300 to − 23,300
1967[9]			− 40,000
1967[10]°		max + 14,000	
1967[11]°			− 30,000
1967[12]			− 40,000
			− 65,000
1967[13]			+133,447 to +191,772

Source: The projected "shortages" and "surpluses" presented here were calculated from the projected supply and projected requirement figures presented on Tables 2, 3, and 4.
° Studies not employing physician-to-population ratio methodology.

[1] (10)   [8] (11)
[2] (32)   [9] (2)
[3] (41)   [10] (33)
[4] (39)   [11] (53)
[5] (4)   [12] (54)
[6] (18)   [13] (49)
[7] (51)

For 1970, a shortage of from 2,500 to 12,469 physicians is projected. Can one conclude that a shortage of 2,500 physicians is "serious"? Surely the appropriate public remedial program would vary appreciably depending on whether the shortage is in the neighborhood of 2,500 or of 12,469 physicians. Moreover, the geographic distribution of the physicians might be of importance in assessing the seriousness of the shortage. Following the Ewing methodology, for example, the Bane report assumed that the 1959 ratio of physicians to population was minimally adequate and then projected a 1970 shortage of physicians of from 2,500 to 4,100 and a 1975 shortage of from 11,600 to 17,200 (4). A logical question to ask is: What, if any, is the rationale for the choice of the 1959 ratio as the projection criterion? The Bane report does not answer this question, and this finding holds for all of the studies of physician shortages which use the physician-to-population approach.

The summary of results presented in Table 5 indicates that by 1975 we can expect either a physician "surplus" or a physician "shortage." At these extremes, one report projected a shortage of 65,000 physicians by 1975. In contrast, the National Advisory Commission on Health Manpower (33) projects a 1975 surplus of 14,000 physicians; Fein (11) projects (under one set of assumptions) a surplus of from 11,700 to 21,700 physicians by 1975; and Stevens projects a surplus far above these levels. Will the future "gap" be a shortage or a surplus of physicians?

Criticisms of the criterion ratio approach

Numerous writers have noted that the normative and/or physician-to-population approach of estimating shortages ignores a number of factors.

(1) In what sense is the selected criterion ratio in any way "optimal," or in what manner does it relate "supply" to "need"? In this regard Klarman writes:

Sometimes a personnel-to-population ratio is chosen at the upper end of an array of such ratios as the criterion or standard. No attempt is made to validate the choice by examining the level of care rendered in the geographical area from which the criterion is derived (27, p. 36).

He makes another point that can be easily overlooked:

This method is logically bound to lead to a finding of shortage, since geographic areas above the standard ratio are allowed to keep their existing personnel (27, p. 368).

(2) The standard ratio implicitly assumes an equilibrium between the demand for and supply of physicians in the base period and that the relation between the criterion ratio and future supply and demand conditions will remain unchanged. Of course, whether or not this is the case is never analyzed (17, pp. 77-78).

(3) In a broad sense, the criterion ratio selected by the various agencies

and commissions represents a value judgment of the physicians needed per capita in the nation. However, to supply physicians according to a second party's "judgment" may result in a serious misallocation of national resources. These studies fail to suggest: how to persuade the population that their judgment of need is correct and how to persuade them to translate this "need" for physicians' services into a willingness to consume physicians' services; how consumer willingness can be translated into market *demand* which is consistent with perceived "need," given that the population faces a financial constraint; and how they determined that society is willing to give an absolute priority to health, regardless of cost, and not to education, housing, or defense (*6; 8; 11; 13; 20; 23; 24; 27; 28; and 53*).

(4) Eli Ginzberg makes the point that even if "need" as perceived by authorities were an acceptable criterion,

. . . the crucial question is whether the graduation of an additional 1,000 physicians in the Northeast would in fact assure such services either for the slum population in New York or for poor whites and Negroes in low-income rural areas of Mississippi (*14*, p. 86).

(5) This final criticism is rather lengthy. The standard ratio approach implicitly assumes that the production function for physicians' services is linear homogeneous, with fixed technical coefficients (i.e., factors are most efficiently combined in a specific proportion irrespective of their relative costs), and stable over time. It is true that if this production function existed and were known, and if the future population were the only determinant of physicians' services demanded and this relationship were known, then, given the projected population and the corresponding quantity of physicians' services demanded, it would be possible to determine the future number of physicians required to match the future demand for physicians' services.

However, as a point of fact, the demand for physicians' services and for most other goods and services depends on numerous factors in addition to the population size (*25*, p. 11; also refer to point 3 above). Among these variables, for example, is insurance. The more people covered by insurance and/or the broader the type and amount of health service coverage, the greater the amount of care used. The logic supporting this proposition is that insurance, by lowering the point-of-service price to the individual below the true cost, causes him to increase the quantity of care he demands (*37, 38*). Clearly, therefore, the projected requirements for physicians' services which rely solely on estimates of future population will be below the true requirements mark if a national health insurance program such as those proposed by President Nixon and Senator Kennedy were to be enacted, ceteris paribus. The Kennedy bill would supersede Medicare and Medicaid and substitute in their place a national health insurance program

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covering the medical expenses of *all* United States residents for the entire range of health services. Likewise, President Nixon's proposal would substitute a Family Health Insurance Plan for Medicaid and would require all employers to provide basic health insurance coverage for their employees. Sharing costs, much as employers and employees do today under most collective bargaining agreements, the administration program would require minimum coverage for a wide range of health care services (36). Failure to consider such a major and likely change in the financing of physicians' services is but another illustration of the weakness of the criterion ratio approach as viewed from the standpoint of the demand for physicians' services.

As for the nature of the production function, most empirical evidence to date suggests that the production function implicit in the criterion ratio approach does not exist in reality. Consider, for example, the changes in factor proportions underlying the data presented in Table 1. Disproportionate changes among the various health manpower occupations have been occurring, and these differential changes will most likely continue into the future.

Greenfield's book, *Allied Health Manpower*, documents the distributional changes which have been occurring in the composition of the nation's health manpower labor force (15). He shows that the change is away from the highly trained physician and dentist and toward less "costly" allied health manpower occupations. These changes in factor proportions could be taking place for a number of reasons. First, the price of physician inputs relative to allied health manpower inputs may be increasing, and thus the latter are being substituted for the former in the production of physicians' services over all levels of production, in an effort to minimize costs. Dr. Anthony Robbins observes in this respect that

. . . in the hospital most daily patient care tasks have been shifted one step or more down the hierarchy, from physician to professional nurse, to practical nurse, to nurse's aid (45, p. 56).

The observed changes in factor proportions may in part also result from changes in the organization of the delivery of health care. Examples include changes which permit the use of relatively more allied health manpower and special equipment because of the specialization, division of labor, and economic use of "lumpy" inputs associated with larger scale organizations (11). Illustrations of the type of organizational changes being referred to are the spread of group practices and the growth in prepaid group health insurance plans. These forms of organizational arrangements are being strongly encouraged by the Nixon administration for numerous reasons, and given the economic incentives proposed in order to foster their more rapid growth, greater changes along these lines are expected in the future (36). Finally, the observed changes in the composition of the nation's health

manpower labor force may be partially explained by the development of *new* tasks to be performed, resulting from improved medical technology, which do not require the skills of a highly trained physician (e.g., jobs in laboratories (45, p. 56).

The number of physicians required to provide a certain level of care will decline with increased productivity. All the above-mentioned factors—substituting cheaper inputs for physicians, changes in the organization of health care delivery, and the development of relatively costly laborsaving technology—can cause physicians' productivity to increase (8, 11, 16, 27), a phenomenon which has been occurring for physicians and probably will continue to occur during the years ahead. This concept was succinctly developed with respect to dentistry by Jeffrey Weiss at the December, 1970, meetings of the Industrial Relations Research Association. Weiss observed:

Dentistry reflects the impact of market factors and technological changes upon the employment of health manpower, based on three levels of job content. For example, from 1950 to 1960, the employment of dentists increased by 26 per cent, while the employment of middle-level and low-level dental personnel increased by 59 per cent and 97 per cent, respectively. While improvements in dental equipment contributed substantially, there is strong evidence to support the view that the substitution of manpower with lower and middle levels of job content for dentists was the most important factor in accounting for the increased productivity of dentists during the 1950's.

Using a surrogate measure of the output of dental services, the average output of a dentist employing one dental auxiliary is 80 per cent greater than the output of a dentist who does not employ any auxiliary personnel. Further, the addition of a second dental auxiliary appears to increase the output of the average dentist more than the addition of the first, and the addition of a third increases output more than the addition of the second. In view of these findings, it is certainly not surprising that from 1950 to 1961 the output of dental services per dentist in private practice increased at an estimated average rate of 3.2 per cent per year, or faster than the rate of increase in productivity generally in the economy (54, p. 64).

The fact that the criterion ratio approach fails to consider future changes in the relationship between physicians' services and the number of physicians is still another major limitation of this method for projecting future physician requirements.

Rashi Fein's study

It should be noted that three of the studies in Table 5 marked by asterisks have not used the physician-to-population methodology. One of these is Fein's projections of the future demand for physicians' services (11). In addition to population changes, Fein's estimated increase in the demand for physician services was based on the following: changes in the age-sex distribution of the population; increased urbanization; the changing population distribution by color; the rising levels of education and income; and

the likely impact of Medicare on demand. On the assumption that the relative price structure would not change between 1965 and 1975, Fein's research represents the most complete analysis of the estimated increase in the demand for physician services to date, and it is far more sophisticated than that underlying those studies which used the physician-to-population ratio.

Considering population growth alone during the 1965-1975 period—as do the criterion ratio studies—Fein projected a 12 to 15% increase in the demand for physicians' services. However, considering changes in all of the above-mentioned factors, Fein projected an increase of from 22 to 26%.[1] On the assumption that an increase in the demand for physicians' services will lead to a proportionate increase in the demand for physicians, Fein's projections may be interpreted as projected increases in the demand for physicians. He does not actually develop an estimate of the number of physicians demanded by 1975, but his arguments are developed as if he had the above assumption in mind and were making such projections.

As we have seen, there are many factors which would increase the productivity of physicians and hence alter the assumed input-output relationship. This point, by the way, was discussed at some length by Fein, but he did not provide any quantitative elaboration.

Putting the question of productivity aside for the moment, Fein concluded that the projected increase in supply of active and inactive M.D.'s and D.O.'s of 19% over the 1960 to 1975 period was more than adequate to cover the *increased demand for physicians* resulting from population growth alone (i.e., 12 to 15%). Note that this conclusion conflicts with those studies which projected 1975 "shortages" based on some physician-to-population standard. However, "in the absence of a rise in productivity," he concluded that a 19% increase in supply would not be sufficient to meet the increase in demand resulting from changes in all remaining demand factors (*11*, p. 135). The weakness in this conclusion is, of course, found in his observation that physician productivity has and probably will continue to increase. On this point Fein states:

With "normal" productivity increases, all of the consumer demand resulting from higher incomes could be met. But greater productivity increases are required if "unsatisfied demand" exists today, if consumer "taste" for medical services increases, or if new financing programs are enacted whose purpose is to increase the amount of medical care available to part, or all, of the population (*11*, p. 138).

Fein's study for actually estimating the *number* of physicians demanded in the future has serious limitations, but it is far more complete than the various normative studies. His approach would be a sound basis for public

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[1] A range which may be considerably below the actual demand if some form of national health insurance is enacted prior to 1975.

decision making if it were possible first to estimate changes in future physicians' productivity, and then to systematically adjust *upward* the "effective" physician supply projections or *downward* the "effective" physician demand projections. To date, however, such a study has not been published.

The Relative Income Approach

Elton Rayack's definition of a physician shortage was given in the first section of this review (44). Rayack compared the change in the average incomes of physicians to those of lawyers, managers, and professional, technical, and kindred workers for the period 1929-1959 in an attempt to measure whether or not there was an excess of demand for physicians over supply of physicians. He found that during this period the relative income position of physicians improved. Further, during this period there was an increase in the number of internships and residency positions filled by foreign physicians. Rayack pointed to substitutions of relatively cheaper inputs for the more expensive physicians' services which were taking place during this period. For example, hospitals were letting registered nurses perform many services once performed by physicians; some hospitals were willing to give staff appointments to graduates of osteopathic schools; and the shortage of physicians had led to a search for substitutes among paramedical personnel.

Based on these findings, Rayack concluded that this evidence is consistent with his definition of a shortage of physicians' services. Rayack's final statement reads:

This article gives a qualitative answer in economic terms about the "direction of effort" which implies the need for a greater growth in the supply of physicians' services than has been recommended by the government (44, p. 237).

However, before one enthusiastically embraces Rayack's analysis as "proof" of a physician shortage in the 1929 to 1959 period, a number of criticisms of this approach must be mentioned.

This method does not provide any basis for determining the magnitude of the perceived shortage, nor does it determine whether the shortage is being eliminated. For example, a very slow adjustment in physician fees due to an increase in demand may well intensify the excess demand, but it will be observed as only a moderate increase in relative income and thus as the existence of a surplus, or as the elimination of a shortage, rather than as a newly developed shortage (3, pp. 292-308).

The choice of a particular base year over some other year for purposes of comparison may have quite significant results (22, p. 423). There is no logical way to determine the beginning of a shortage (17, p. 80).

The Internal Rate of Return Approach

The relative earnings approach just discussed has been criticized, in addi-

tion to the points listed in the two previous paragraphs, for its failure to include in its analysis of shortages the cost of training. This criticism, however, must be tempered somewhat since the two approaches—as noted earlier—employ different definitions of the term "shortage." The first approach measures the excess of quantity demanded over quantity supplied, and the second is used to denote a situation where barriers to entry have caused a misallocation of resources between occupations. Accordingly, it is possible that the two approaches will give contradictory answers to the same questions. In the case of nurses, see, for example, Don Yett's study entitled, "Causes and Consequences of Salary Differentials in Nursing" (57).

Hansen (17) compared the internal rate of return of physicians to an alternative internal rate of return. The alternative rate was computed from data on male college graduates, and that rate was assumed to represent the long-run equilibrium internal rate of return. Using the computations procedure discussed in the first part of this review, Hansen interpreted his results by assuming that deviation in the internal rate of return of physicians of at least 4% from that of male college graduates indicates a shortage (if the deviation was positive) or a surplus (if the deviation was negative). The internal rate of return to male college graduates and physicians was compared for three years, 1939, 1949, and 1956. Hansen's empirical results showed that the rate for physicians fell from 1949 to 1956, although it was still above that for male college graduates. Thus, he concluded that the shortage of physicians had been declining.

Compared to the relative earning approach, the internal rate of return methodology does indicate the direction of changes over time in the perceived shortage or surplus situation. The major problem with this approach, however, is that the choice of a reference group—and consequently "equilibrium rate"—is somewhat arbitrary and can alter one's conclusions. Clearly, if the rate used as a basis of comparison is not the equilibrium rate, then this approach is of little value. Whether or not one accepts Hansen's conclusions regarding a "diminishing shortage" of physicians between 1949 and 1956 depends of course on the degree of confidence one has in the assumption that the "prevailing" rate earned by male college graduates is the equilibrium internal rate of return.

Conclusions and Future Research

Acknowledging that merely producing larger numbers of physicians will not necessarily guarantee their flow to remote areas or to urban poverty neighborhoods where there is an "obvious need," some of the Carnegie Commission recommendations are sound. For instance, the problem of an inadequate geographic distribution of physicians may be partially corrected through the development of Area Health Education Centers. Further, recommendations for inducing efficiency and cutting costs, such as reducing

from four to three years the time it takes to get an M.D. degree, are always welcomed. But how about the recommendations which are rationalized from the presumption of an aggregate physician shortage—how can they be adequately evaluated?

Past studies do not provide a sound empirical basis for accepting the "assertions" that in the aggregate there have been or will be physician shortages of a "crisis" magnitude. The results from these studies, when compared, present a mixed, contradictory, and confusing picture. The methodologies followed by the normative studies demonstrate "nothing more than impressionistic judgments of the demand or requirements" (8, p. 18). These studies fail to consider adequately either the demand for physicians' services and for physicians, or the cost of providing the services.

A conclusive analysis of whether or not a current or future physician shortage exists or will exist is yet to be performed. Two crucial components of any future study of physician shortages must be the inclusion of the concept of a generalized production function for physicians' services, and the inclusion of national health insurance in the analysis of the demand for physicians' services.

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