

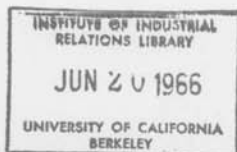
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SELECTED BIBLIOGRAPHY AND ABSTRACTS OF PUBLISHED MATERIAL ON
WAGE STRUCTURES AND LABOR MOBILITY IN THE U. S.

Prepared by the

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MOBILITY

Richard A. Lester, "Wage Diversity and Its Theoretical Implications,"
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The actual wage facts seem contrary to what conventional theory leads one to expect. Perfect competition seems to be the exception. Demand and supply do not eliminate gross inequities or gross irrationality. Movement in response to varying wage rates does not occur even in the same locality; one of the most significant facts about wage rates is their variation for the same job in the same labor market. Instead of one rate, there is usually a band, with a substantial range between highest and lowest.

Ranges in Average Earnings. The Bureau of Labor Statistics collected 2,900 ranges (the spread between highest and lowest plant averages) for selected occupations (Table 1). Taking each occupation separately, average hourly earnings in the highest-paying establishments exceeded those in the lowest by an average of 50 per cent in all industries. In almost one tenth of the cases, the highest plant average was at least double the lowest. Factors accounting for some of the diversity were: varying number of establishments in occupational categories for each labor market; the inclusion of workers on piece work and incentive pay; minor variations in job content and in geographical area. Nevertheless, the diversity was great.

Ranges in Plant Averages for Cotton Textiles. A study by the author was designed to eliminate some of the defects noted above of the BLS surveys. Table 2 shows the spread in straight time hourly earnings between high and low plant averages for six cotton textile

TABLE 1

Distribution of Spread in Straight-Time Hourly
Earnings Between High- and Low-Plant Averages
for Selected Occupations in Each of
48 Labor-Market Areas

Percentage by which high plant exceeded low plant	Frequency
0 to 2.9%	19
3 - 5.9	53
6 - 8.9	79
9 - 11.9	96
12 - 14.9	111
15 - 17.9	104
18 - 20.9	128
21 - 23.9	129
24 - 26.9	129
27 - 29.9	110
30 - 32.9	140
33 - 35.9	151
36 - 38.9	135
39 - 41.9	102
42 - 44.9	119
45 - 47.9	126
48 - 50.9	94
51 - 53.9	87
54 - 56.9	86
57 - 59.9	55
60 - 62.9	84
63 - 65.9	67
66 - 68.9	54
69 - 71.9	54
72 - 74.9	50
75 - 77.9	44
78 - 80.9	55
81 - 83.9	35
84 - 86.9	53
87 - 89.9	22
90 - 92.9	43
93 - 95.9	19
96 - 98.9	17
99 - 100.9	21
101 - 110.9	56
111 - 125.9	70
126 - 150.9	59
151 - 200.9	37
201 - 300	17

occupations in 15 labor market areas in 1943 and 1945. Table 3 gives coefficients of average deviation. Great diversity is again apparent. Wage variation may be as great in one labor market as in a whole region, and may be double or triple that in another labor market. (Unionism was not important here. Only four of the plants were organized, and they were not the high wage plants.)

Theoretical Implications. Uniformity of wage rates in a labor market is exceptional. It is likely to occur only through government action, collective bargaining, or combined action of employers -- i.e., not because of competition but because of concerted action or restraint of competition. A study of wage determination must take account of psychological, social and historical factors. Employers can apparently select the point, within a band or range of rates, at which they establish occupational wage levels. The determining and limiting factors have yet to be ascertained.

Richard A. Lester, "A Range Theory of Wage Differentials," Industrial and Labor Relations Review, July, 1952.

The continued existence of genuine, local interfirm differentials in wages cannot be explained satisfactorily by orthodox theory. There is a pressing need for new theoretical formulations in the labor field.

Some of the striking findings of recent investigations in this field:

A Bureau of Labor Statistics survey in 1943-44 of 48 labor market areas found that, for the same occupation, differentials among firms in the same area were distributed over a range with no marked central tendency, and that straight-time hourly earnings in a particular occupation were as much as 50 per cent higher in the top-paying plant than in the lowest. Interfirm diversity in wage scales, measured by the coefficient of average deviation, was almost as great in some cities as in a whole region. And in some cases, the local range failed to contract despite the shift from widespread unemployment to general labor scarcity in the 1940's.

An examination by Reynolds of starting rates in 28 manufacturing firms in New Haven indicated that interfirm differences were almost as great in 1948 as in 1942 -- the rate in the highest-paying plant was 78 per cent higher than in the lowest-wage firm in 1940 and 72 per cent higher in 1948 -- and yet the low-wage establishments suffered from no shortage of labor.

The North-South differential also varied widely and irrationally: e.g., in one pulp and paper firm, the Southern scale was 5 per cent higher than the Northern; in another firm in the same industry, Southern scales

were 21 per cent below Northern scales.

Although the skilled-unskilled differential has fallen, it may still range from 30 per cent in one firm to 100 per cent in another, in the same industry and in the same general area.

Local Differentials. The author studied 40 manufacturing plants in Trenton. Starting rates and average hourly earnings in the lowest-wage firms were only half as high as in the top plants. In general, there seemed to be no direct correlation between wages and quality of work force, although this was apparent in a few cases. The reasons for these large differences lay in the following management practices: in general, hiring was done only at the bottom. Word-of-mouth was relied on to secure applications at the time labor was needed (no applications were kept after three months); applicants had to decide immediately whether or not to accept the job; no one employed elsewhere was considered (antipirating convention); and the most mobile workers, "drifters" or "floaters," were usually rejected. After a probationary period, the worker was secure in his job from outside competition. Promotions were effected from within. In many plants, eligibility in benefit plans discouraged mobility. The wage structure was often governed by a job evaluation scheme and union policies, both remote from labor market conditions in the locality.

Workers were unable to shop around for jobs, because of lack of information and because of the management hiring preferences listed above. Once employed, they tended to develop attachments to the firm; the avoidance of risk and uncertainty seemed to be a powerful motive. Financial considerations were not uppermost -- in part because they were hard

to compare, depending as they did on possibilities for overtime and the operation of incentive systems; the highly personalized reputation of the firm seemed more important.

In summary, workers with from one to four years of experience, usually about 80 per cent of work force, were therefore attached to the firm, and out of the job market. Movement of the other 20 per cent could serve to eliminate differentials if it were not so random and impulsive.

Occupational Differentials. Intraplant wage structures are notoriously haphazard and irrational. Great interfirm differences in the skilled-unskilled wage ratio persist; companies have considerable latitude, particularly in setting rates for skilled work that does not cross industry lines but is attained by on-the-job training, with promotion on a seniority basis from within. Job evaluation schemes also indicate that market forces are largely inoperative because the criteria or factors are usually nonmarket.

Regional Differentials. These are of long standing, with great but apparently random variation.

Conclusion. A new theory must take account of historical and institutional factors and the practices of workers and management. Theorists have underrated the anti-competitive factors and impediments to competition in the labor market. Instead of a competitive or equilibrium wage, a range of indeterminacy exists. Company managements vary in labor patterns and can often select a position of long-run stability at various points within the range of indeterminacy.

Louis R. Salkever, "Toward a Theory of Wage Structure," Industrial and Labor Relations Review, April, 1953.

The incongruity between the empirical studies in this field and the implications of the static, long-run, full-employment models of neoclassical theory has led some economists to attribute the gap to imperfections of the market or of the data, and others to conclude that any theoretical construction is futile. Neither approach will lead to the enrichment of knowledge.

Methodological Problems. Explanations in terms of random variation about a basically stable relationship must be rejected. Wage structure is constantly changing and multivariate, requiring comparative statics and dynamic analysis rather than static equilibrium analysis. On the other hand, mere accident can account for the transient existence of a phenomenon but not for its persistence.

The debate between marginalists and antimarginalists has been confused by misunderstanding of terms. Marginal analysis, if appropriate when applied to the functional distribution of real income, is not appropriate for the analysis of occupational distribution of money income. Furthermore, what is true of the whole is not necessarily true of the parts.

However, dissatisfaction with extant theory should lead to something better than antitheoretical conceptions. One can hardly quarrel with a conclusion that wage rates are set by wage bargainers, or that they are affected by "numerous economic, psychological, political, social and institutional factors," but to name the procedure is not to explain the process. Nor can much be gained in the way of theoretical constructs

from the available empirical data. The data are more or less sufficient to support initial constructs of some usefulness in indicating a relationship between the size of skill differentials and economic fluctuation (Dunlop); between productivity, unionism, and interindustry differentials (Garbarino); and between the degree of unionization and the union-nonunion differential (Ross). The need, however, is for more general propositions for which empirical tests can then be developed.

Slichter found a spread of rates for identical occupations in the same locality, but also a surprising amount of regularity. This would be the expected result of a discontinuous relationship, differing not only among individuals and occupations but also over time.

To the seller of labor, even when alternatives are perfectly perceived, immobility may be rationally based on the costs of change -- economic, social, psychological. Furthermore, inability to forecast with precision the future behavior of the economy prevents use of a simple calculus of present disadvantage versus future advantage. But if differentials had no effect upon mobility, the labor market would be characterized by a completely inelastic labor supply curve for each employer, which does not exist any more than the completely elastic supply, with each incremental change in wages attracting substantial amounts of additional labor.

The physicist has noted that a body at rest tends to remain at rest until the force upon it becomes sufficient to overcome inertia. Employment consciousness rather than wage consciousness, reluctance to change and the like are the determinants of a social inertia which may, up to a critical point (a sufficiently wide wage difference), inhibit

movement and make wage rates operative below the level of observation.

Emergence of Occupational Differentials. An occupational structure arises with the introduction of division of labor in the plant. The employer must make some judgments on the relative importance to the total productive operation of each task, and will be less willing to risk the loss of the more strategically located worker. The latter in turn will become unwilling to work effectively at a "higher level" job without a wage difference. As the occupational structure matures, labor supply and the nature of the learning curve become more important influences on the development of differentials than the primitive ordering of job importance.

The comparative advantage to the employer, with persistent unemployment the condition of the economy, to replace or retain particular job occupants which becomes reflected in the relative wage level, depends on the nature of the learning curve. In the performance of a specialized task, output per manhour increases for a time directly as a function of time on the job. This is distinct from prior training, and from improving technology. Existence of such a gap explains the willingness of an employer to pay currently employed workers more than he would have to pay replacements.

Learning curves are not identical for all occupations. It is logical to assume that the higher the skill, the longer the time required before the learning curve levels off. Therefore, as we ascend the skill level, the disparity between the output of the employed worker at or beyond the leveling-off point of the learning curve, and that expected of comparably trained replacements, should increase. Despite individual

differences, and without assuming any precise computation by the employer, occupational differentials can be explained on this basis alone, without assuming artificial restriction of labor supply, the equating of the utility and disutility of nonmoney factors, or any artificial marginal analysis.

Changes in Differentials Over Time. The literature is full of valuable insights into factors inducing changes in differentials, but there was no recognition of the dynamic nature of the problem. The influences of training costs, duration of employment, and financial risk were regarded as stable, and expectations were ignored. For example, the cost of acquiring skills is affected by the economic environment: if there is an increased demand for a skill throughout the economy, exhausting the pool of unemployed workers, training programs will be supported by firms and by public agencies, thus altering individual evaluations of both the costs of training and expected return on skill investment, with a corresponding change in impact upon wage differentials.

Mobility of Labor Supply. The concept of a labor reserve, adapted by Beveridge from Marx to explain the irreducible minimum of unemployment, is more useful than the traditional concept of noncompeting groups. Unemployment or a higher wage is often insufficient to effect movement in the short run because of attachment to a firm or industry: longshoremen, for example, seem to be less mobile than carpenters. Occupations unique to a firm or industry will tend to be less mobile than those which cut across industry lines.

The effect of a wage differential or a change in a wage differential on mobility is, therefore, conditioned by the nature of the appropriate

labor reserve. A change in the output of an industry will have a disproportionate influence on the size of differentials according to the nature of the labor reserve for each occupation employed in the industry -- an increased output would be expected to raise the wage differential for occupations required which cut across industries more than for occupations for which the industry labor reserve is sufficient.

The Product Market. The product market and its subsidiary, the market value of the productivity of a firm's labor force, impinge more on the total wage bill than on occupational differentials. But again, occupational groups more concerned with retention of employment, and less sensitive to wage rates outside the firm, are more likely to feel the effect of a product market change on the total wage bill.

Economic Fluctuations. The decision to undergo training is not independent of economic fluctuations. The expectation of yield from increased skill is more favorable during an upswing, and the observed narrowing of differentials results from the increased supply of skilled labor in that phase of the cycle. The converse is true in the downswing.

The fact that alterations in differentials can occur within a single phase of the business cycle, as the experience of the National Wage Stabilization Board indicated, can be explained by the learning curve, which is conditioned in part by the economic environment but is also subject to interfirm variation in output, which may differ from total economy trends. The learning curve in each occupation is a function of continuous employment at a particular task. Increased production lessens the gap between periods of plant operation and reduces the time required to reach average efficiency. During expansion the learning curve is

changed most for higher-skill groups, for whom the parameters of the output/time function are widest. Hence differentials narrow in expansion. During a contraction, the effect of the learning curve is to widen differentials.

Fluctuations in the level of activity also exert differential pressure on wage demands of occupational groups. With rising prices, the income-need pressure becomes stronger the lower the occupation. In contraction, the fear of losing jobs is stronger for the lowest skills.

The structure of the labor reserve is also affected by changes in general economic activity. If the reserve is built around an occupation with considerable cross-firm and cross-industry mobility, expansion will increase ability to move, thus offsetting to some extent the narrowing effect of the other factors discussed.

Role of Governments. The influence of governments and quasi-governments (e.g., trade unions) is easily exaggerated because of their prominence in the procedure of wage determination. Their actions are not exogenous variables but are conditioned by the other factors discussed. In the long run, government and group action may alter the institutional framework within which wages are determined. This would require the reformulation of the propositions adumbrated here.

Clark Kerr, "The Balkanization of Labor Markets, " Labor Mobility and Economic Opportunity, 1954.

Kerr explores the notion of the institutionalization of "natural" or "free choice" markets. Free markets are characterized by indistinct boundaries, geographically and occupationally. The institutionalization of such markets is the effect of the establishment of formal and informal rules which divide the market into definite and limited noncompeting groups.

In the short run, there have always been recognized barriers to free choice in the labor market: noncompeting socio-economic groups; the desire for security; Personal preferences of employers. The craft existed without the craft union, and informal job ties without seniority rules.

Institutional rules replace the free and ignorant many by the knowledgeable group. Unions establish sovereignty over a "job territory;" outsiders are noncitizens without rights. Whether by action of the community of workers, of the community of employers, or by government, controls on movement from these sources are defined as institutional rules whether they are written or merely implicit.

Among the great variety of rules, two general systems are discussed:

1. Communal Ownership. The craft union -- e.g., in the building, printing, maritime and teamster trades -- asserts proprietorship on behalf of its members over the jobs falling within a carefully defined occupational and geographical area. Employers must hire union members; workers enter the market through the unions. Unions may exercise preferences (on sex, race, political grounds); usually local members are preferred to transfers even from another local. Apprenticeship programs are sometimes the only means of entry.

When work is abnormally plentiful, some unions issue work permits, giving temporary employment rights to outsiders.

Movement is primarily horizontal, among employers, with the primary tie to a skill and a looser tie to the employer. The worker gets his security from union control of the labor supply -- and from closed shop agreements, under which membership in the union must precede employment.

2. Private Property. In industrial enterprises, the market is reduced to the irreducible minimum by seniority provisions. New workers are hired by the company; as jobs open up, the workers move up in order and as they close, workers move down in order. Often ability is a criterion along with seniority, but this is still an internal submarket to which outsiders have little or no access. The worker is held not only by prospects of advancement but perhaps by a pension plan as well. Other employers would be reluctant to hire him away from his firm, under the customary gentleman's agreement against pirating. In any case, he would need to start again at the bottom of the seniority ladder in another plant with lower status and income.

Movement here is vertical, within the plant, rather than horizontal.

Ports of Entry. Even in the absence of institutional rules, most employers consider a job not open for bid if the incumbent is satisfactory, and they generally prefer to promote from within to canvassing the open market. Rules, however, set sharper boundaries between internal and external markets and define more precisely the ports of entry: broadly, the union office, and the company personnel office. Contact with the external market is only at restricted points, with hiring generally only at the bottom of each grade (common labor, clerical, etc.). As specifications become more formal and cover more jobs, determination of the specifications becomes of increasing concern to persons

in the external market who are universally unrepresented in the councils which set the specifications.

The Economic Impact of Institutionalization

1. The rules which unions use for admitting members and employers use for hiring workers can have important consequences for the productivity of the economy depending on the comparative emphasis on efficiency and acceptability.

2. The effects on mobility can only be surmised, but mobility is probably reduced. In general, craft rules impede interoccupational mobility, though they may increase interindustry mobility, as in the case of maintenance workers, or decrease it as in the case of longshoremen. The rules of industrial unions generally restrict interindustry mobility. The rules of both groups attempt to reduce mobility between the categories of employment and unemployment and between labor force participation and withdrawal from the labor force, since a high degree of attachment to the work force is usually needed to preserve the rights and privileges of union membership. Both sets of rules also tend to hold unemployed workers to their special market rather than encourage them to compete actively for jobs elsewhere.

3. Craft unions use their control over the supply of labor to preserve the wage rate rather than to force it up. Supply adjusts to demand, once the rate is fixed. If supply is greater than demand, the union controls the flow of new members and encourages work-sharing programs; and when supply is less than demand, issues work permits or encourages mechanization.

4. Industrial unions, lacking the same degree of control over labor supply, exert their efforts to control demand (dismissal bonuses, guaranteed wage). Since seniority rules tie workers to the plant, unions must be more

concerned with the employment effect of their wage demands. In general, seniority reduces the minimum price which holds the worker to the plant. Further, the reduction of contact with the external market encourages job evaluation plans to set acceptable rates in the internal market.

5. In both cases, wage rates are less effective in allocating labor than they are in free markets, just as labor mobility is less potent in setting wage rates.

Conclusions. The locus of decision making has shifted from individual workers and employers in the free markets to groups of workers and bureaucratic managers in the institutionalized markets. These groups have established other criteria than just the pecuniary one: seniority, order, security and certainty. Decisions are made automatic, according to rules, rather than according to individual judgments. Rules, however, may reflect prejudices just as much as individual judgements may.

Seniority rules are probably more restrictive of individual freedom and retard efficiency more than craft rules, which are the customary target for criticism. The role of the government is likely to be limited to making the rules affecting entry more equitable. But if the laws of the private governments of industry and labor fail by too great a margin to meet public views of welfare, the "planned" labor market may succeed the institutional market.

Simon Rottenberg, "On Choice in Labor Markets," Industrial and Labor Relations Review, January, 1956.

This article is a defense of the classical theory of labor mobility against criticisms by empirical researchers. The classical theory, developed by Adam Smith, can be summarized as follows: Since each individual is motivated by his own self-interest, he will seek the occupation which is the most advantageous and least disadvantageous to him. Thus, he will maximize his net advantage, giving some weight to both pecuniary and non-pecuniary considerations. As a consequence of this behavior any increase (decrease) in the net advantageousness of one occupation relative to all others will cause a redistribution of employment to (from) that occupation from (to) all others.

Although critics assert that the theory assumes that relative compensation is the only factor which is relevant to occupational choice, the theory gives proper recognition to independent variables such as status, uncertainty about employment, disagreeableness of the occupation, and so forth. It is, however, part of the theory that an increase in the compensation for an occupation, ceteris paribus, will mean that more individuals will be attracted to that occupation. Similarly, an increase in some non-pecuniary attribute of an occupation will attract more workers to that occupation. The purpose of theory is to abstract from a rather complex motivational system some sound principles which yield "tolerably good" predictive results -- not to describe all outcomes.

Robert J. Lampman, "Communication: On Choice in Labor Markets," Industrial and Labor Relations Review, July, 1956.

Rottenberg asserts that the classical wage theory offers "verifiable" predictions concerning worker mobility. For example, it predicts that an individual will choose a "dirty" job over a "clean" job if the wage differential is just sufficient to overcompensate for differential "cleanliness" because the individual seeks to maximize his net advantage. This is, however, not a "verifiable" proposition because one could argue that the choice of either employment is consistent with the theory. If the individual chooses one against the other, it is because the net advantage of the one must be greater than the net advantage of the other. The same sort of argument is applicable for other predictions of the classical theory. In other words, it is tautological. //x

Melvin Reder, "Wage Differentials: Theory and Measurement," Aspects of Labor Economics, National Bureau of Economic Research, 1962.

This study considers two specific types of wage differentials: occupational and interindustrial. The discussion is prefaced by four warnings: (1) As usually measured, wages exclude the pecuniary value of fringe benefits. This may well distort comparisons for the postwar period. (2) Wage levels may refer to any of several concepts: straight-time hourly wages, average hourly earnings including overtime, mean or median weekly or annual earnings. They do not vary proportionally from one industry or occupation to another. (3) Frequency distributions are often indicated only by mean or median, leaving unexplored other aspects of earnings distributions. (4) Variations in hiring requirements, and therefore labor quality, and the attractiveness of jobs to workers, are important factors although they are usually omitted for the sake of brevity.

Occupational Wage Structure. The skill differential is measured by the percentage difference between the hourly earnings of workers designated as skilled and unskilled. The percentage measure is chosen rather than absolute differences because of interest in the "welfare-distribution" question.

Secular Behavior of the Occupational Wage Structure. Most authors have argued that percentage occupational wage differentials have shown a secular tendency to diminish. Generally, empirical evidence supports this conclusion, with important exceptions. If differentials have declined, then close substitutes for urban unskilled labor should have experienced a relative increase in hourly earnings -- and some have not.

done so. For example, laundry workers have experienced a relative decline, as have agricultural workers, especially for the 1950's, although the evidence is somewhat contradictory.

A possible explanation for these contradictions is the declining industry argument: Some workers cannot or will not leave the declining industry, and as the immobile workers disproportionately represent the older segment of the industry's labor force it is to be expected that in the short run there will be a decline in the quality of the labor force as well as a decline in employment.

A more general argument for decreasing occupational differentials follows from conventional price theory. The educational level of the labor force has increased, and with it the proportion in skilled employment. The failure of relative demand for skilled workers to increase as much as supply has led to a decline in skill differentials.

However, the causality in this argument is open to question; the secular increase in the relative number of skilled workers may be due to changes in relative demand. But, several factors imply that relative demand has not shifted: (1) Increased schooling is due in part to compulsory attendance. (2) There has been a sharp reduction in child labor because of legislation. (3) The major cause of increased private spending on education has been increased income: private education below the college level is viewed as a consumer rather than producer good. (4) Those who increase earning power by acquiring education generally go into business and professions rather than into skilled manual work. The evidence is that supply factors are adequate to explain the decline in skill differentials.

It is also possible that economic progress will transform the occupational wage structure so that the "pleasant" jobs will receive low pay. If white-collar jobs are considered pleasant, then one result of rising national income might be a greater supply of white-collar workers, thereby tending to narrow wage differentials.

The author rejects the argument that inflation is a long-run cause of narrowing wage differentials, or that efforts to stabilize prices will remove the pressure for diminishing them. The reason is the existence of a real minimum wage below which hiring is not countenanced. This minimum is subject to a money illusion, so that a secular rise in price levels leads to a secular decline in wage differentials.

The Pattern of Short-Run Fluctuation in Skill Margins. It is generally agreed that in the short run skill margins change relatively little in normal times, but contract sharply during periods of over-full employment. However, what has not been accounted for is the fact that the sharp narrowing during periods of high labor demand has been only partially reversed in low-demand periods. Two possible explanations of this pattern are offered.

During periods of over-full employment (specifically wartime), partially trained workers can replace skilled workers because they can be kept busy at a narrower range of tasks; the elasticity of substitution between partially and fully skilled workers is increased.

The second explanation is suggested by the behavior of "experience differentials." The tight labor market reduces the availability of experienced workers, and thus the costs of finding an experienced worker must include: (1) the time-consuming process of finding and recruiting a

currently employed worker; and (2) the additional cost of inducing him to leave an established situation. Neither of these factors is as important for the inexperienced worker, and the high demand for labor is likely to affect the inexperienced more than the experienced worker, thereby closing the "experience differential." Given the frequent association between skill and experience, the skill differential is likely to move with the experience differential, which implies that the wages of unskilled or inexperienced workers are apt to be more sensitive to the state of the labor market.

Interindustry Differentials -- The Long Run. Most discussions of interindustry differentials proceed without much consideration of economic theory. If an ad hoc theory is inconsistent with the implications of price theory, an explanation is in order. Consequently it is important to spell out the price theory implications for interindustry differentials.

In the long run, real wage differentials among industries will reflect differences in the skill mix. Money wage differences between locations should be no greater than can be rationalized by differences in living costs. In the short run, skill differentials should be positively associated with changes in employment, due to short-run inelasticities in labor supply. But long-run correlations between wage levels and factor quantities should be zero.

Some evidence has been presented in support of the competitive hypothesis. Studies have shown that the rank correlation coefficients between (a) wages and labor employed, and (b) wages and tangible capital owned, were not significantly different from zero at the 5 per cent level.¹ There was insignificant correlation between productivity and average

1. J. W. Kendrick, Productivity Trends in the United States, Princeton, National Bureau of Economic Research, 1961.

hourly wages among 33 industry groups during the period 1899 to 1954. In addition, there was no significant correlation between user cost of capital and average hourly labor compensation. There is, however, slight negative correlation between unit prices of output and factor productivity.

Another finding that bears upon the competitive hypothesis is the behavior of the interindustrial wage structure itself. The competitive hypothesis implies that there should have been a secular decrease in inter-industry relative dispersion because of the secular decline in skill margins and in regional differentials. Although direct evidence of diminishing relative dispersion is difficult to find, it has been shown by Cullen and Woytinsky that particular industries at the high and low extremes of the distribution in a particular year tended to move toward the mean over time.

The author summarizes Slichter's views on the long-run equilibrium industrial wage structure, and comments on two.

Slichter finds substantial correlation between net income as a percentage of sales, and average hourly earnings. He then concludes that wages in the main reflect managerial discretion. However, correlation may also be explained by analysis of the firm's behavior. Many large and profitable firms ignore local market conditions and pay high wages to avoid intercompany differentials and to be selective in hiring practices. This does not explain movements in relative wages. The industrial wage structure is affected insofar as in some industries the percentage of workers employed in large firms is greater than in others. There might well be an association between high concentration ratios and high wages at a given moment in time. Such an observation would not justify

the conclusion that there would be an association between changes in relative industrial wage levels over time and the index of concentration at any moment in time. A more legitimate phrasing of the question would be: are changes in industrial concentration correlated with changes in occupational wage levels? The evidence indicates that such a hypothesis is not confirmed.

Slichter also asserts the existence of a strong inverse association between hourly earnings of unskilled labor and the ratio of payrolls to sales. In the absence of competition such a hypothesis seems plausible. However, an alternative explanation seems more likely: high ratios of payrolls to sales are found in industries that specialize in fabrication operations, and are associated with low wages because the likelihood of such specialization is greater where the fabrication can be performed by low-wage labor. This should only hold in the short run.

The Short Run. The competitive hypothesis explains variations in wage structure as follows: Wages increase in industries where employment is expanding because of short-run inelasticities of labor supply, and fall in industries where employment is shrinking because of labor immobility. Considerable evidence has been gathered on this relationship, and it shows strong positive correlation between wage changes and employment, tending to confirm the competitive hypothesis.

However, several significant studies (e.g., Levinson, Bowen) show that positive correlations obtain in periods of low unemployment, but in periods of high unemployment the correlations are either insignificant or negative. If this evidence is accepted then the competitive hypothesis is uninformative, if not invalid as an explanation of short-run movements

of differentials.

Profits, Concentration, and Related Variables. The evidence seems to indicate a fairly strong positive correlation between industry levels of current profits and relative industry wage levels. This supports the conclusion that wages are in fact set at the discretion of management, at high levels when possible, and at lower levels when profits drop. It is important to distinguish between levels and movements: The competitive hypothesis is perfectly compatible with the notion that profitable firms pay high wages, but it is less clear that profit differentials explain movements in interindustry wage structure.

For some periods the latter hypothesis seems to hold, but on the whole, industry concentration seems a much better explanatory variable. Average changes in hourly earnings were greater in industries characterized by unionization and concentration. This may be due to the slow response of concentrated industries to changing demand. Therefore the period of high profits, full capacity operation, and strength in product prices lasts longer. It is argued that this gave rise to relative increases in earnings in the concentrated sectors in the 1950's.

Firms may be willing to grant wage increases if they can recoup increased costs by increased product prices. The supposition that two sectors of the economy (concentrated and competitive) behave differently with regard to the ratio of wages to productivity is in direct conflict with the competitive hypothesis. However, to argue that movements in relative wage levels are strongly correlated with relative profits or changes in product prices does not contradict the competitive hypothesis per se. Both these variables may be correlated with variations in the

level of employment and reflect only the influence of the latter on relative wages.

Productivity. The evidence on the relation between man-hour productivity and wages hardly permits the acceptance of any hypothesis relating these variables.

Unions. Consideration of unions has been eliminated since research has failed to show significant relationships between the influence of unions and movements in interindustry wage differentials. One would expect that where profits are correlated with wage changes the correlation should increase under the influence of unionism.

Conclusion. The competitive hypothesis is at its best in explaining long-run variations in both skill margins and interindustry differentials. In the short run it does not appear very reliable.

W. Rupert MacLaurin and Charles Myers, "Wages and the Movement of Factory Labor," Quarterly Journal of Economics, February, 1943.

This article is based on a study of a New England labor market during the prewar years of 1937, 1938, and 1939, and a re-examination of the same market in 1942. Attention was focused on the amount of movement between firms and the effect of movement or lack of movement on equalization of wage rates for comparable jobs.

Two adjacent, medium-sized Massachusetts cities were chosen for this study. They contained a considerable number of different industries, and were the trading centers of a substantial farming area. They were sufficiently distant from any other important towns to form a distinct and compact labor market. This was not a high wage region, and unionism did not become an important factor in wage determination until 1941-42. The community was also characterized by considerable home ownership and important racial and religious influences.

Wages, working conditions, labor turnover, hours worked, and other information were collected in the initial period; and in 1942 the market was re-examined and interviews were conducted to assess the employers' and workers' reasons for changes.

The period studied contains a complete cycle from peak activity through recession to the recovery of 1937 levels.

Findings. The findings suggest that the theory of wages as presented in economic literature must be modified to take more adequate account of the barriers to movement which exist within a labor market. In this community, typical of a great many small American manufacturing cities in the period from 1937 to 1942, the principal barriers to inter-factory

movement may be summarized as follows:

A. Demand Side

- (1) The existence of a "gentlemen's agreement" among many of the factories not to hire labor away from each other.
- (2) The prevalent practice of hiring primarily relatives and friends of present workers. The absence of effective centralized hiring methods which would ensure employment on the basis of merit.
- (3) The prejudice against hiring older employees who had worked for a considerable period in some of the lower-paying industries; the real difficulty of re-training the less adaptable of such workers to work on new types of machines; and the preference of "unspoiled" new workers from the high schools.

B. Supply Side

- (1) The tendency of workers to seek and accept jobs in their immediate neighborhood, often through the influence of employed friends or relatives.
- (2) The absence of effective vocational guidance or advice on the part of the school system which would widen the workers' horizon and choice.
- (3) The reluctance of many workers to risk their seniority position by moving.
- (4) The weakness of financial incentives for movement as opposed to accustomed and friendly environmental conditions.

These barriers were so effective that, except under extreme boom

conditions, the amount of movement in the direction of high-wage concerns was distinctly limited. The absence of a greater threat of movement considerably weakened the economic pressure on the low-wage firms to bring their wage levels into line. On the other hand, many of the high-wage concerns were reluctant to take advantage of periods of unemployment by cutting wages. This appeared to be caused partly by the fear of labor resentment, which would reduce morale and output even though not affecting movement, and partly by unwillingness to cut workers' incomes as long as the company had the capacity to pay the existing scale of wages.

This article indicates that further classification and analysis of the relation between wages and movement in other types of labor markets and for other types of workers would be helpful. Valuable, too, would be an understanding and analysis of the social systems to which the workers belong, the influences of family and school, and the social organizations developed by some employers, which succeed in tying workers to particular firms regardless of wage differentials.

This study suggests that horizontal barriers to movement make the gravitational process toward the higher paying jobs very slow. Further standardization of wages may develop through "interference" by the State, and by the spread of collective action on the part of management and unions, but there is little apparent tendency toward the equalizing of efficiency earnings from the flow of labor into the most favorable channels.

Sol Sverdloff and Abraham Bluestone, "The Mobility of Tool and Die Makers,"
Monthly Labor Review, December, 1952.

The Bureau of Labor Statistics made pilot studies of the training, work experience, mobility, and personal characteristics of workers in several occupations vital to defense. This article examines the extent and kinds of job changes made by 1,712 tool and die makers selected from the payrolls of 315 metal working plants in seven large metal working areas. The workers, chosen to reflect generally the national distribution of tool and die makers among industries, were personally interviewed on their work histories for the 11 years between 1940 and 1951.

Tool and die makers are at or near the top of the occupational ladder for skilled workers and, therefore, have relatively little inducement to go into other occupations. On the other hand, they can find jobs in more than 9,000 plants in a wide range of metal working industries throughout the country. This gives them considerable opportunity to shift among employers or industries. In general, the 11-year period was one of very favorable employment opportunities for tool and die makers. The wide availability of jobs made it easy to change jobs in order to get higher pay or better promotional opportunities or, for that matter, to change jobs when working conditions, personal relationships, or plant location were not entirely to their liking.

Extent of Mobility. Nearly 3/5 of the 1,712 workers interviewed had worked for only one employer. The 733 who had changed jobs averaged nearly three shifts each, but the amount of movement differed considerably among individual workers: more than half of those who changed jobs made only one or two moves: 3/5 of the job changes were made by the 229 workers

who made four or more job shifts each.

Patterns of Interindustry Job Changes. An important conclusion obtained from analysis of the work histories was that those tool and die makers who changed employers did not appear to have strong industrial attachments and that they were able to cross industrial lines freely. At least one-third of the tool and die makers studied in each industry had not originally qualified as journeymen in the industry in which they were working at the time they were interviewed.

Geographic and Occupational Mobility. Although nearly 43 per cent of the sample had changed jobs, less than 9 per cent reported that they had changed cities during the 11 years. Of these, about 5/6 made only one or two such shifts, although some individuals made as many as six. Personal considerations were the main reason for moving. Inducements -- such as better pay -- which led to shifts from one employer to another in the same area, apparently were not so effective in inducing workers to move to other areas.

During the period covered, more than 90 per cent of the men interviewed had worked only as tool and die makers after becoming qualified journeymen, because of the high level of skill required. In general, movement is only upward to supervisory work; to working in lower-skilled machine-shop jobs; or to moving out of the machine-shop occupational field entirely.

When the workers interviewed did move out of the occupation, they tended to work in closely related fields; about half of the outside jobs held were either as machinists, machinery repairmen, or machine-tool operators.

Factors Affecting Amount of Mobility. Mobility was affected by such factors as age, education, and length of time in the labor force during the 11 years covered by the survey. Younger workers and those with more education tended to be more mobile. In addition, it varied according to the industry in which tool and die workers were employed at the time they were interviewed; the aircraft and machine tool industries had more fluctuations in employment than motor vehicles. On the other hand, other characteristics did not appear to have affected the propensity to change jobs: workers trained by apprenticeship and those who had qualified by other means were about equally mobile; foreign-born workers shifted proportionately as much as those born in this country; married and single workers experienced about the same rate of job change, although single workers moved from one geographic area to another much more often than did married workers.

Reasons for Changing Jobs. Reasons given fell into two broad classes: voluntary and involuntary moves. Two out of three of all the job changes were made voluntarily. More than half were made to obtain better jobs, either in terms of pay or potentiality for advancement. The desire to improve working conditions or the location of the job was the reason given for another sixth of these job changes.

Part Two. Monthly Labor Review, January, 1953.

Personal Characteristics

Age. The median age of the tool and die makers interviewed was 44. Because the occupation requires a long training period, and many of the recent entrants into the occupation were war veterans, few workers were

under the age of 25. Distribution according to age was: 25 per cent in each of the three age groups 25-34, 35-44, and 45-53 years; less than 20 per cent 55 to 64 years; 5 per cent, 65 years and older; less than 1 per cent under 25 years.

Dependency, Marital, and Veteran Status. Ninety per cent of the men interviewed were married; 90 per cent had dependents other than their wives. 17.4 per cent were veterans of World War II. Many of the workers would be likely to receive occupational deferments because of the key importance of their work, as well as for age and dependency status.

Education. Six per cent of the men had academic training beyond high school, 29 per cent had eight or fewer years of schooling, but 40 per cent were high school graduates. This distribution by educational level showed a greater concentration about the median than the average of the United States male population. Younger men had more schooling than the older men; educational backgrounds of those who had served apprenticeships did not differ materially from those who had not.

Nativity. More than 25 per cent of the men were foreign-born. Nearly one-half of those above 45 years were foreign-born, but less than 10 per cent of those under 45.

Farm and Nonfarm Upbringing. About one-sixth of the workers had been raised on farms. Newer workers have been coming from cities and towns, in keeping with the general shift of U.S. population to urban areas.

Occupational Choice and Method of Entry

One-quarter of the 1,287 men interviewed indicated that they had just drifted into tool and die making. The remainder gave the following reasons:

Job Aptitude or Interest: Six hundred and twenty one believed that they were mechanically inclined, and wanted to work with their hands.

Economic Considerations: One-sixth of the 1,287 tool and die makers who answered stated that they entered the occupation for better wages, a chance for advancement, and/or an opportunity for apprenticeship or other training.

Family Backgrounds: Seventy per cent of the men whose fathers were tool and die makers reported that they had entered the trade for that reason, indicating that family background played an important role in job determination. In all, one-third reported that other members of their families had been or were in the trade.

Occupation of First Job: More than half of the tool and die makers started out by working in the trade. Of 1,135 men who served apprenticeships, over half became apprentices in the trade immediately after leaving school. But only two-fifths of those who did not serve apprenticeships started out in the metal working trade, indicating that many men shift into tool and die making after time spent in unrelated work.

Opinions of the Occupation as a Career

Of the 1,712 men interviewed, one-fifth said they would not recommend it; more than three-fifths recommended it unqualifiedly; and the remainder recommended it with reservations. Those men who had given definite reasons for entering the trade were more likely to recommend it, while the proportion having unfavorable opinions was twice as high among the men who merely drifted into the occupation.

In conclusion, this article indicates that proper vocational guidance

and a positive choice on the part of the individual are helpful in producing well-adjusted workers.

Part Three. Monthly Labor Review, March, 1953. (Complete report in Bureau of Labor Statistics, Bulletin No. 1120.)

Methods of Qualification

Apprenticeship. About two-thirds of the men had served apprenticeships; 20 per cent underwent more or less formal on-the-job training; the remaining men "just picked up" the trade while working in tool rooms or machine shops.

Training Levels. A table is included which indicates the various training levels in the major metal working industries. Generally, there were fewer men who had served apprenticeships working in the aircraft industry (about 40 per cent) while in the motor vehicle industry, 80 per cent of the men had served apprenticeships. In the age group 35-40, less training was had by the men, probably due to the paucity of training available during the depression years of the 1930s, when these men entered the labor market.

Effect of Training on Work Experience. The mobility of non-apprenticed tool and die makers was the same as that of men who had served apprenticeships, contrary to the usual assumption that a comprehensively trained worker has greater mobility than does a worker who has not served an apprenticeship. However, while the method of training did not affect the workers' ability to cross industry lines, it did slightly alter the chance for reaching a supervisory level. For example, of the 1,712 workers interviewed, 204 were in supervisory positions; this number included only 10 per cent from the group of 577 men who had not served apprenticeships,

but 13 per cent of the 1,135 men who had served apprenticeships.

Manpower Implications of Training. An expansion of apprenticeship training is necessary in setting up programs to provide for the additional tool and die makers who will be needed for mobilization production and for the long-run growth of the economy. Also, more attention should be given to the informal method of qualification, so that workers learning the trade through this process can be given maximum opportunity to improve their skills.

Gladys Palmer, H. S. Farnes, Richard C. Wilcox, Mary W. Herman, Carol P. Brainerd, *The Reluctant Job Changer*, 1962.

(One chapter of this book, "Workers' Attitudes to Job Changing: The Effect of Private Pension Plans," by Herbert Farnes, has been summarized separately.)

Attachment to occupation and company was investigated through interviews of a sample of 199 workers in four occupations, two skilled and two semi-skilled, in Springfield, Illinois. Propensity to stay with the company was measured by questions relating to future plans; and choice between occupation and company, on the reaction to a hypothetical question concerning elimination of the current job by the company.

A second study of 193 semiskilled production workers in Columbus, Ohio attempted to measure company ties by reactions to two hypothetical questions: whether the respondent would accept the offer of an identical job with another employer at 30 cents an hour more pay; and whether the worker would return to the company after layoffs of varying length, if he had already found identical work and pay elsewhere.

A third chapter analyzed the work experience and attitudes of tool-makers in Philadelphia as revealed in comparable studies made at three different times, 1924, 1936 and 1951. Mobility measured by length of job held at date of survey, declined substantially between 1924 and 1951 (but was highest in 1936, a depression year). Obtaining better pay was the reason given most frequently for a voluntary change of employment in all three samples.

The penultimate chapter (v), "Class Concepts, Aspirations, and Vertical

Mobility," presented an analysis of workers' views of the American class structure and desires for upward mobility, and the effects of these attitudes on satisfaction in their occupations. A study made in 1952 of 797 persons in Norristown, Pennsylvania was cited, and compared with the answers to some unstructured questions put to the 199 Springfield production workers, and other studies in this field.

Conclusions

1. Studies of production workers show that, in spite of the relatively routine nature of some of the jobs performed and the lack of training required for them, most men tend to develop ties to a company or an occupation that make it unlikely they will move frequently from one job to another.
2. Marked differences appear between skilled and semiskilled workers in the relative strength of occupational and company ties.
3. There appears to have been a gradual decline in mobility rates in recent decades.
4. All the studies testify to the importance of seniority rights in tying workers to their jobs, whether in respect of promotion, protection against layoffs, vacations or pensions.
5. Other attitudes also served to discourage mobility: general fear of the unknown was an important factor; expectations of better pay or advancement were also cited. Skilled workers were more attached to an occupation (as distinguished from an employer) than the unskilled, but they too were strongly influenced by seniority factors.

6. The evidence in Chapter V suggests that most workers in less skilled jobs are not completely content with their occupational roles; while seeing little chance of improvement for themselves, a large proportion would like to see their children enter professional occupations. They want their sons to have as much education as possible (but are less eager to educate their daughters).

Herbert S. Parnes, "Workers' Attitudes to Job Changing: The Effect of Private Pension Plans," in Palmer and others, The Reluctant Job Changer: Attitudes in Work Attachments and Aspirations, Chapter III.

The rapid growth of private pension plans through collective bargaining during the past decade has been cited almost universally by students of the labor market as an institutional impediment to the mobility of labor. Concern for retirement benefits is likely to be most characteristic of older workers with relatively long periods of service with a company, and there are a number of other factors that tend to tie such workers to their current jobs. One is seniority rights, conferring security as well as opportunities for advancement, and another is the psychological comfort of familiar surroundings. The objective of this study is to assess the relative influence of private pension plans.

Design of the Study. Interviews were conducted with almost 200 married male production workers between the ages of 35 and 50 in two Columbus, Ohio, firms, one with and the other without a pension plan (but with a lump sum payment after five years of service on separation for any reason). The two groups were quite similar with respect to personal characteristics, background and employment experiences, and they showed remarkable agreement on the factors essential to job satisfaction: wages, physical characteristics of the job, human relations factors (quality of supervision, fellow workers). Fringe benefits were mentioned infrequently. Only 2 per cent in each plant mentioned a pension or retirement plan as one of the things they liked best about working for their respective employers.

The most pronounced difference between the two samples occurred in

their reaction to plant conditions: there was greater satisfaction in firm N (no pension) than in firm P, although this was difficult to account for in terms of the objective conditions of the two firms.

Measures of Stability. The question whether the workers of the two companies differed significantly in their disposition to remain with their employers -- stability does not necessarily coincide with satisfaction -- was investigated.

One-third of the men in each sample said they had turned down offers of other jobs while employed. Only a tenth of one sample and 2 per cent of the other had actually looked for other jobs.

To a hypothetical question -- whether they would take an identical job with another company at 30 cents an hour more pay -- by far the greatest number stated without qualification that they would not. To a second hypothetical question -- whether they would return to the current employer after layoffs of varying duration, assuming that they had in the meantime been successful in finding identical work and pay elsewhere -- the largest number, almost 50 per cent in N and 40 per cent in P, said they would return to the employer after one year even if they had found another job, and larger percentages would do the same after a shorter layoff.

In each case, seniority was the most important influence on decisions; reluctance to face the unknown was next. Pensions were mentioned by only a few workers as a factor.

Reaction to Problems of Retirement. One-third and one-fourth of the workers in the two samples expected to have income from some other source on retirement. Over one-third of the workers in P failed to

mention their company's pension plan. Moreover, three-fourths in sample N and almost two-thirds in sample P had no idea what their monthly Social Security (government) benefits would be.

Summary. If the workers in the present study are typical, male factory employees between the ages of 35 and 50 do not devote much thought to the problem of retirement. A large majority of the men still had children under 18 living at home, and therefore faced problems more immediate than retirement. It is possible that workers over 50 would respond differently.

The evidence suggests that other factors are so potent in tying workers with several years of service to their employers that the existence of a pension produces no appreciable additional effect. Would the same pattern be likely in an identical study conducted among workers to whom job security was not so crucial a problem? It is reasonable to assume that professional and managerial groups would be more influenced by nonvested pension rights.

"Private Pension Plans and Manpower Policy," Bureau of Labor Statistics
Bulletin No. 1359, 1963.

This Bulletin reviews the effect of corporate pensions on various aspects of manpower policy, including labor mobility, the employment opportunities of older workers, and retirement withdrawal from the labor force. Only the first two topics will be summarized.

Labor Mobility. Studies have demonstrated that firms with pensions have lower separation and quit rates than firms without pensions, and this difference is often cited as evidence that pensions reduce labor mobility. However, firms with pension plans frequently have other characteristics which tend to hold older workers on their jobs. The same firms are also likely to be unionized, to pay higher wages and salaries, and to have more effective job security provisions based on length of service. No study of mobility has been conducted in such depth as to isolate the effects of these individual factors. The effect of pensions may, however, be significant for certain occupational groups (such as senior white-collar workers and executives), and may also reduce the mobility of older manual workers in some depressed industries areas.

To the extent that the individual's pension rights are vested (or some degree of portability is provided in other ways) the immobilizing effects of pensions are counteracted. The trend in recent years towards the adoption of vesting provisions and the increasing prevalence of multi-employer plans has acted to limit any adverse effects of pensions.

Employment Opportunities of Older Workers. Firms with private pensions often refuse to hire workers above a certain age. The reasons

given by employers for not hiring older workers often relate to the existence of a pension plan. Thus employers appear to be reluctant to hire older workers who are too close to retirement age or whose pension costs are higher than the pension costs of younger workers. Under most definite-benefit pension formulas, the pension costs of older workers are likely to be somewhat higher than those of younger workers. However, undue weight may be given by the employer to the additional cost.

The reluctance of pension firms to hire older workers is usually not a direct result of the pension plan itself. Rather, it is likely to reflect the same factors that led to the establishment of a pension program -- namely, a desire to keep a balanced age distribution of the work force, to promote from within the organization, and to train as new employees individuals who have a relatively long future working life. This view is supported by studies showing that in spite of age limitations, in practice firms with pensions appear to hire about as many older workers as they separate, and have the same proportion of older employees as do firms without pensions.

Vincent F. Gegan and Samuel H. Thompson, "Worker Mobility in a Labor Surplus Area," Monthly Labor Review, December, 1957.

The study of mobility in Harrison County, West Virginia, was based on records of the federal Bureau of Old-Age and Survivors Insurance and the state unemployment insurance agency. Basic materials used were, first, the OASI quarterly wage and employment records for individual workers who were employed in Harrison County, and for whom records by county were available in both terminal quarters of the period studied (1st. Quar. 1953, 1st. Quar. 1955). Coverage was about 75 per cent of total wage and salary employment, including all workers in nonagricultural establishments except railroads, government, and a few minor groups. The information included sex, age, earnings, and industrial employment status, and location of employment, during each of the terminal periods. Second, state unemployment insurance records were used to obtain data on the unemployment benefits received in West Virginia by the individuals under study.

Three groups were identified by social security numbers: (1) those who left employment in Harrison County and found covered employment elsewhere; (2) those who remained in covered employment in the county; and (3) those who entered into covered employment in the county after the first quarter of 1953.

Unemployment. Despite outmigration, unemployment in Harrison County has ranged from 4 to 11 per cent of the labor force since 1950 and has been consistently higher than the national average. In April and October 1954, the unemployment rate was estimated to be twice the national rate. From March 1954 through September 1955, unemployment remained above 6 per cent and the county was classified by the U.S. Department of

Labor as an "area of substantial labor surplus." Since October, 1955, however, the unemployment rate has remained below the 6 per cent level.

The continuous level of high unemployment portrays a general decline rather than a catastrophe, such as the shutdown of a major plant in a one-industry town. In the two-year period studied, there were 367 business deaths and 204 business births, for a net loss of 163 establishments which had provided about 900 jobs.

In the first quarter of 1953, workers in OASI-covered employment in Harrison County who were within the scope of this study numbered 22,098. Two years later, 15,006 of these were still in covered employment within the county, and 4,024 or 18 per cent of the total had migrated. The remaining 3,068 were not in covered employment anywhere in the first quarter of 1955. During the period, 1,500 "immigrants" entered the work force as well as a number of "new entrants" and "reentrants."

Migration. Young people under 25 migrated in substantially higher proportions than older workers. But one of the most significant findings is that as many as one-fifth of the men in the study between 35 and 44 became migrants. Normally, one assumes that men in this age group will have found a firm place in the community.

Destination of Outmigrants. Of the 4,024 outmigrants, 42 per cent remained in West Virginia. An additional 31 per cent went to the neighboring states of Ohio, Pennsylvania, Maryland, and Virginia, while 3.9 per cent migrated to Michigan.

Industrial Attachments. Nearly three-quarters of all migrants came from four industry groups: coal mining (20 per cent), manufacturing (20 per cent), retail trade (21 per cent), and public utilities (14 per cent).

Although two-thirds of the outmigrants who were working in OASI-covered employment at the end of the period were still found in these four industrial groups, nearly 67 per cent of them had changed industry, compared with only 15 per cent of the nonmigrants.

In those industry groups where particular skills have a closer identification with a specific industry, such as construction or mining, the proportion that shifted was substantially lower. But even here much shifting occurred: 54 per cent of the workers formerly in mining shifted industries, as did 65 per cent in construction.

Comparative Earnings. Comparison of earnings at the beginning and end of the period shows that the migrants had received considerably lower earnings in the first quarter than nonmigrants. Median incomes for these groups were \$511 and \$826 respectively. Assuming the same amount of earnings in all four quarters, this would mean a difference of \$1,260 in annual income.

Seventy per cent of those who migrated were at work in covered employment in the first quarter of 1955, and they were earning much higher incomes than they had earned in Harrison County two years earlier. The median quarterly earning had increased from \$511 or an average of \$39 per week, to \$723, or \$56 per week. The migrants were not as well paid as the nonmigrants who had maintained their 1953 industry connections, but they were better paid than nonmigrants who changed industry.

Unemployment and Migration. Examination of data on the unemployment experience of the migrants while in West Virginia reveals that a great many of them had had spells of unemployment as well as lower earnings. More than twice as high a proportion of migrants as those who remained received

benefits for total unemployment in West Virginia at some time during the two-year period, i.e., 20 per cent as compared with 9 per cent.

Robert L. Stein, "Unemployment and Job Mobility," Monthly Labor Review, April, 1960.

This article analyzes job mobility in relation to unemployment, both as cause and effect. The data are derived from a Census Bureau survey for 1955. Job mobility is defined as any change of employer during a calendar year, regardless of whether or not it also involved a change in occupation or industry and whether it was voluntary or involuntary.

The questions to which the article addresses itself are:

1. How much unemployment was associated with job shifting?
2. What were the characteristics and unemployment experience of job shifters as compared with other workers?
3. How important was voluntary job changing as a reason for unemployment?
4. To what extent did unemployment lead to job changing?

After how long? Among which groups in the labor force?

Briefly, the major findings were: (1) Whatever their reasons for leaving a job, the job changers as a group were five times as likely as other workers to have had some unemployment during the year. More often than not, unemployment preceded job changing and was more important as a reason for mobility than as a direct effect. (2) Job shifting was most frequent among young workers, the unskilled, and those in seasonal activities such as agriculture and construction. These groups experienced the highest rates of unemployment; this was true even for workers who had no job change during the year. (3) Voluntary job shifting in order to improve one's status was a relatively minor source of unemployment in 1955.

Hence, it did not explain, to any significant degree, differences in unemployment rates among various age, sex, occupation, and industry groups in the work force. (4) About 1.8 million workers with some unemployment in 1955 were persons who had lost a job involuntarily, because of economic reasons or because of the termination of temporary employment. At the same time, there were 6.1 million workers who had unemployment, but no job change (i.e., temporary layoff, and subsequent return to same job). The average duration of unemployment among the 1.8 million involuntary job changers was longer than among the 6.1 million nonchangers. The median duration of unemployment was 9.5 weeks for the changers, 7.5 weeks for the nonchangers. A higher proportion of the job changers than of the nonchangers had more than 15 weeks of unemployment (31 per cent, compared with 28 per cent). The prolonged unemployment among changers was due to reluctance to shift to another employer and in some cases the complete disappearance of certain jobs. The relationship between layoffs and job changing varied among different groups in the labor force. Unemployed men were much more likely to be job changers than were unemployed women in all age groups. Young men, 18 to 24 years of age, who had been laid off had the highest rates of job changing (one in three), but a substantial proportion (one in four) of men between 45 and 64 years of age also changed jobs after a layoff. Not only were job-changer rates lower for the middle-aged, but also those who did change had been unemployed longer: about two out of five had 15 weeks or more of unemployment; only one out of four younger men who shifted jobs had lost that much time.

Workers from seasonal industries were most likely to change jobs after a period of unemployment (one in three). Unemployed workers from

manufacturing and closely allied industries such as transportation and mining had a job change rate of one in five.

Glen A. Mumsy, "The Parity Ratio and Agricultural Out-Migration,"
Southern Economic Journal, July, 1959.

It is often argued that high farm prices impede the transfer of labor from agricultural to non-agricultural employment and that agricultural price supports are, therefore, a factor leading to a misallocation of resources. It was found, however, that there is a positive correlation between parity ratios and civilian agricultural out-migration for the periods April 1922 to April 1929 and April 1946 to April 1956, with a correlation coefficient (r) equal to +0.48.

Parity Ratios and Civilian Agricultural
Out-Migration for Select Years

<u>Year ended April 1</u>	<u>Parity Ratio</u>	<u>Civilian Out-Migration Rate</u>
1923	88	2.6
1924	88	1.6
1925	91	2.3
1926	95	2.9
1927	88	1.5
1928	91	1.4
1929	92	1.6
1947	115	6.4
1948	114	1.4
1949	108	5.1
1950	98	4.3
1951	105	0.4
1952	105	7.8
1953	98	5.0
1954	92	5.4
1955	88	0.6
1956	83	1.3

This does not necessarily refute the conventional theory since a constant farm income deficiency has been associated with an almost constant out-migration. This merely shows that the degree of income pressure has not caused corresponding changes in out-migration rates.

C. E. Bishop, "Economic Aspects of Changes in Farm Labor Force," in Labor Mobility and Population in Agriculture, 1961.

Underemployment in the agricultural sector exists when the marginal real return to labor services in farming is less than the marginal real return for comparable services in other uses. This implies the absence of non-pecuniary considerations and also that there is at present some amount of labor which is willing to move at the existing wage differential. The failure of labor to move may be due to any one of three reasons: (1) capital is not available to finance the cost of movement; (2) information channels are inadequate; or (3) employment opportunities do not exist in sufficient numbers in the non-farm sector.

The first two of these factors can be discounted. The cost of movement is relatively trivial, and information channels seem to be relatively well established now as compared with earlier times. In the third case, the actual rate of migration is determined by shifts in the demand for labor in non-farm employment. Thus, the hypothesis is presented that the number of farm workers willing to move to non-farm jobs is greater than the capacity of the non-farm sector to absorb them.

The following regression equations were obtained using U. S. Department of Agriculture data for 1930-60, excluding the abnormal war years 1942-47:

Y = rate of migration (%),

X_1 = ratio of the mean farm worker income to the mean non-farm worker income.

X_2 = rate of unemployment in the economy (%).

$$(1) Y = -2.476 + .111X_1 \quad *$$

$$(2) Y = 3.822 - .130X_2 \quad **$$

$$(3) Y = -2.560 + .118X_1 - .014X_2 \quad **$$

Using the data for which the rate of unemployment is, first, greater than the median rate and, second, less than the median, further results are obtained:

$$(4) Y = 4.736 + .164X_1 \quad *$$

$$(5) Y = 7.896 - .079X_1 \quad ***$$

* - significant at the one per cent level

** - " " " five " "
 *** - not " " " " "

The surprising result in this analysis is the positive sign of the regression coefficient in b_1 in equations one, three and four. This implies that the higher the ratio of farm to non-farm income, the greater the rate of migration. This is, needless to say, contrary to what one would expect on the basis of economic theory. In equation five, b_1 is negative, but the relationship is not significant. There is, however, a great deal of collinearity between the two independent variables.

The result does support the hypothesis that the supply of labor from farm employment to non-farm employment is infinitely elastic in the relevant range and that the crucial variable which induces people to leave the farm is the rate of unemployment. This implies that a policy of improving job opportunities in the non-farm sector is necessary to facilitate the socially desirable transfer.

Belton M. Fleisher, "Some Economic Aspects of Puerto Rican Migration to the United States," Review of Economics and Statistics, August, 1963.

This paper is an investigation of the role of economic incentives in inducing Puerto Ricans to migrate to the United States (primarily New York City). The theoretical model employed is based on the empirical observation that in the short run the rate of migration is dependent not on income differentials but on unemployment rates and job availabilities and the pecuniary cost of moving. Income differentials are important in the long-run calculation of the potential migrant, but these do not change significantly in the short run and can therefore be expected to have little influence.

To test the hypothesis and to develop further understanding of the migration process, let Y , the rate of net migration from Puerto Rico to New York (measured in hundreds) be correlated against a number of independent variables. The principal explanatory variable, X_1 , is an "unemployment ratio" which is based upon the unemployment rates in the source and receiving areas of migration, U_p and U_u respectively.

$$X_1 = \frac{U_p - U_u}{U_u}$$

The other variables are:

X_2 : Ratio of gross hourly earnings in manufacturing in New York against earnings in Puerto Rico.

X_3 : Puerto Rican population in the United States.

X_4 : Cost of air transport from Puerto Rico to New York divided by Puerto Rican per capita income.

The statistical results are as follows:

$$(1) Y = 118 + 104X_1 ; r^2 = .61$$

$$(2) Y = -8 + 118X_2 ; r^2 = .09$$

$$(3) Y = 341 + 118X_1 - 78X_2 ; r^2 = .64$$

$$(4) Y = -6 + 119X_1 + .365X_3 ; r^2 = .77$$

$$(5) Y = 221 + 116X_1 - .706X_4 ; r^2 = .83$$

Clearly, the two "best" explanatory variables are the unemployment ratio and the cost of air transport, which is consistent with the initial hypothesis. The third variable, the number of Puerto Ricans living in the United States, was inserted to give an index of the flow of information from the United States to Puerto Rico about conditions in the United States. The more people in the United States sending back information, the higher one would expect the rate of migration to be.

It is interesting that the exclusive use of the rate of unemployment in New York yields as good a result as the ratio X_1 . This implies that the economic conditions in the receiving area are of primary importance and that the economic conditions in the source area are of little importance.

Sidney A. Fine, "A Reexamination of 'Transferability of Skills' -- Part II,"
Monthly Labor Review, August 1957.

The need for a method of recognizing transferability of skill possibilities is the most pressing problem of the many involved in the development of this type of mobility. The approach presented here is based on the work of the occupational research program of the United States Employment Service.

Job Descriptions. With a sample of 4,000 jobs, 18 per cent of the total occupations listed by the Department of Labor, the first attempt was to develop a profile of each, based on 25 to 30 ratings, but this was rejected because excessive detail emphasized the peculiarities rather than similarities among jobs. A simpler approach, based on work performed and training time, turned out to be more fruitful.

Work Performed. It is essential in describing a job to distinguish between what the worker does from what gets done, particularly where a machine or other tool is involved. Often the functions of the machine are mistakenly ascribed to the worker: e.g., both an automatic screw machine operator and a turret lathe operator may turn metal fittings, but the former may merely feed a machine whereas the latter may set up the machine, adjust its controls and feed it.

It was found that jobs could be described by 26 functions, arranged from simple to complex, appropriate to work with Things, Data and People. Ratings from 1 to 8 indicated the relative importance of the three types. E.g., the job of turret lathe operator was: operating-controlling, a function under Things; computing, under Data; and speaking-signaling, under

People; and the relative weights assigned to each were 7, 2 and 1, respectively, indicating that the main function was concerned with Things.

What gets done, the second element, was classified into about 100 categories, such as nailing, soldering, recording, etc. The third element -- materials, products, subject matter and services -- comprised about 500 items.

Training Time. This is a crucial determinant of the practicability of transfers. General education requirements were evaluated on a 7-point scale for reasoning, mathematical and language development. Specific vocational preparation was defined strictly in terms of time, from a short demonstration period (level 1) to more than 10 years (level 9), for on-the-job training, apprenticeship, institutional or vocational training.

Establishing Orders of Similarity. Further research will make it possible to group occupations by degrees of similarity in the five areas described. The practicality of transfer can then be ascertained on an objective basis. E.g., first order similarity exists for jobs with the same function, work field, materials (or products, subject matter or services), and with low training time.

The usefulness of such a system can be demonstrated in a case of a mine shut down in a depressed area: among the mining skills in excess supply in the area would be that of pumpman, which requires a relatively low level of training. Analysis of the job, and reference to the catalogue of 4,000 jobs, indicates that there is nothing in the first order of similarity of work performed, but three in the second order (including one job in the rayon industry and two in petroleum), and so on, up to a total of 23 jobs in many different industries in which placement of the pumpman might be practical from the point of view of the use of existing skills.

Gerhard E. Lenski, "Trends in Inter-Generational Occupational Mobility in the United States," American Sociological Review, October, 1958.

The research reported here is an age cohort analysis of inter-generational mobility in a nation-wide sample of adult males. The data was obtained by the Survey Research Center of the University of Michigan in its study of the 1952 presidential election. One thousand, seven hundred ninety-nine adults selected from the American population as a whole were interviewed and this clustered sample was employed as the basis of the present analysis. The final study group included 747 respondents, or almost 95 per cent of the male respondents in the original sample.

Respondents and their fathers were divided into three occupational categories

The most notable fact is the marked difference between the occupational distributions of the two generations. Whereas more than 40 per cent of the respondents' fathers were farmers, only 15 per cent of the respondents so reported themselves. In contrast, although only 20 per cent of the respondents' fathers were white collar workers, almost 35 per cent of the respondents reported themselves to be in this category. The fact that nearly half of the respondents assign themselves to an occupational category other than that of their fathers suggests a tremendous degree of mobility during the period in question.

Since a rather strong case can be made for the view that the movement between the blue collar and farming occupations involves no significant change in the social status of the individuals concerned, the proportion of persons in the sample classified as mobile

Table 1

Occupations of Male Respondents by Occupation
of Respondents' Fathers

Respondent's Occupation	Respondents' Father's Occupation			
	White Collar	Blue Collar	Farmer	Total
White Collar	99	87	69	255
Blue Collar	52	188	139	379
Farmer	<u>2</u>	<u>5</u>	<u>106</u>	<u>113</u>
Total	153	280	314	747

is reduced to 28 per cent of the total. The latter, nevertheless, represents a substantial degree of vertical mobility.

The present analysis is less concerned with mobility in the sample as a whole than with mobility in the several age cohorts, since it is only from this latter source that conclusions can be drawn concerning trends. Thus Table 2 divides respondents into five age cohorts: the first includes all men in their twenties and the last, men sixty and over: each of the intermediate cohorts embraces a ten year span.

Uncritical inspection of Table 2 might suggest a notable decline in the opportunities for social advancement among the sons of farmers and of blue collar workers, as well as some increase in the rate of downward mobility among the sons of white collar workers. Actually, however, at least three considerations make such conclusions unwarranted. First, certain demonstrable sampling errors in the data must be corrected. Second, the exclusion of college students from the sample creates a bias which requires correction. Finally, this table provides no control for the differential effect of intra-generational mobility on the several cohorts.

The problem of correcting sampling errors was not difficult. As a first step, an attempt was made to estimate the occupational distribution by age cohorts for 1952 by projecting the 1930-1950 trends for each age category (not cohort) to 1952. The results of this projection are shown in Table 4. Assuming that the figures in Table 4 represent the true occupational distributions in the cohorts at the time of the sample, and further, that the errors of oversampling and

Table 2

Occupation of Male Respondents by Occupations
of Respondents' Fathers, by Date of Birth of
Respondents, in Percentages

Date of birth of respondent	Respondent's Father White Collar Worker				
	Respondent's Occupation				
	White collar	Blue collar	Farmer	Total	N
1923-1932	60.0	40.0		100.0	20
1913-1922	66.7	33.3		100.0	42
1903-1912	52.3	45.5	2.3	100.1	44
1893-1902	79.2	16.7	4.2	100.1	24
1853-1892	73.9	26.1		100.0	23

Date of birth of respondent	Respondent's Father Blue Collar Worker				
	Respondent's Occupation				
	White collar	Blue collar	Farmer	Total	N
1923-1932	25.4	74.6		100.0	63
1913-1922	27.8	71.1	1.1	100.0	90
1903-1912	30.8	65.4	3.8	100.0	52
1893-1902	42.1	55.3	2.6	100.0	38
1852-1892	37.8	59.5	2.7	100.0	37

Date of birth of respondent	Respondent's Father Farmer				
	Respondent's Occupation				
	White collar	Blue collar	Farmer	Total	N
1923-1932	11.4	62.9	25.7	100.0	35
1913-1922	12.5	51.6	35.9	100.0	64
1903-1912	30.6	38.9	30.6	100.1	72
1893-1902	30.4	37.5	32.1	100.0	56
1853-1892	20.7	40.2	39.1	100.0	87

Date of birth of respondent	All Categories of Respondent's Father				
	Respondent's Occupation				
	White collar	Blue collar	Farmer	Total	N
1923-1932	27.1	65.3	7.6	100.0	118
1913-1922	31.1	56.6	12.2	99.9	196
1903-1912	36.3	48.8	14.9	100.0	168
1893-1902	44.1	39.0	16.9	100.0	118
1853-1892	33.3	42.9	23.8	100.0	147

Table 4

Estimated Occupational Distribution for Age Cohorts
in 1952, in Percentages

Date of birth	White collar workers	Blue collar workers	Farmers	Total
1923-1932	29.1	59.4	11.6	100.1
1913-1922	32.5	56.4	11.1	100.0
1903-1912	33.6	54.0	12.4	100.0
1893-1902	32.6	53.4	14.0	100.0
1883-1892	29.0	51.6	19.4	100.0
1873-1882	29.1	41.2	29.7	100.0

undersampling particular categories of respondents were randomly distributed among the several categories of fathers, a ready basis for correcting sampling errors is available.

A number of college students were inserted into the first cohort to correct for their omission, on the basis of available evidence concerning the occupational origins and careers of undergraduate and graduate students.

To meet the problems created by intra-generational mobility required a technique which would permit comparisons among cohorts in terms of a common period in the life cycle. Only in this way could trends in inter-generational mobility be established. The technique used does not permit easy summary; interested readers are referred to the original article.

After correction for intra-generational mobility, the data indicate that more of the sons of both white collar and blue collar workers in the youngest cohort will become white collar workers than in any of the previous cohorts. In other words, the rate of downward mobility from the white collar ranks seems to have declined from earlier decades while the rate of upward mobility from the ranks of blue collar workers seems to have increased. For farmers' sons, the percentage entering the white collar category steadily increased until the middle cohort, and then dropped sharply in the most recent cohorts. This decline is especially significant in view of the growing frequency with which farmers' sons leave the land and enter urban occupations.

Table 7 shows a calculation of the volume of upward and downward movement in the total male population. As inspection of Table 7 indicates, trends in rates of upward and of downward mobility have been markedly

Table 7

Estimated Percentage of Males Upwardly Mobile, Downwardly Mobile,
and Non-Mobile According to Inter-Generational Occupational
Mobility, By Cohorts

Date of birth	Upwardly mobile	Non-Mobile	Downwardly Mobile	Total	UM-DM [*]
1923-1932	22.9	72.1	5.0	100.0	17.9
1913-1922	19.9	73.9	6.2	100.0	13.7
1903-1912	20.9	65.5	13.6	100.0	7.3
1893-1902	18.1	75.1	6.8	100.0	11.3
1873-1892	17.4	77.4	5.2	100.0	12.2

^{*}Upwardly mobile minus downwardly mobile, that is, net upward mobility.

different. The trend for upward movement rises slowly but steadily, with a single exception, during the period in question. The trend line for downward movement, however, approximates an inverted U-curve with a very high peak in the middle. This capacity of the two trends to vary independently is a feature of change in systems of social stratification that has not thus far received the attention it deserves.

In conclusion, the findings of this study tend to confirm certain trends suggested in earlier investigations of limited segments of the American population. In addition, they suggest trends which have not previously been noted: the "independent" variation of the trend lines for upward and downward mobility and the relative decline in the chances of formers' sons attaining white collar status seem especially noteworthy.

Lowell E. Galloway, "Labor Mobility, Resource Allocation, and Structural Unemployment," American Economic Review, 53, September 1963.

This paper is an attempt to gain some insight into the question of intrafactor resource allocation within the labor market in the United States from 1948 to 1960. After reviewing the theory of a perfectly competitive labor market, the author concludes that the basic empirical problem in judging the efficiency of the "real-world" allocative mechanism is to distinguish between "economic" and "non-economic" imperfections in the labor market. If there are no economic barriers to mobility, if opportunity costs do not change substantially, and if adjustment lags are spread more or less evenly throughout the industrial sectors, there should emerge a history of relatively constant wage differentials between sectors. This implies that sectoral wage rates will show a high positive correlation through time. Similarly, there should be a high positive correlation between sectoral unemployment rates through time.

Two sufficient conditions which guard against the possibility of the two previously defined necessary conditions being satisfied in the face of restrictive barriers in the allocative mechanism are set forth: First, there must be no appreciable change through time in the distribution of sector wage rates. Second, there must be no appreciable change through time in the rank order of the sector wage rates.

The statistical technique which is used to test these hypotheses is a modification of that used by Solow in his work on the alleged constancy of relative shares. A test statistic is derived,

$$R = \frac{\sigma^2 - \hat{\sigma}_0^2}{\hat{\sigma}_2^2 - \sigma_0^2}$$

where σ^2 is the actual variance of the aggregate series, $\hat{\sigma}_0^2$ is the predicted variance of the aggregate series based on the assumption that each series is perfectly independent of every other, and $\hat{\sigma}_1^2$ is the predicted variance of the aggregate series based on the assumption that each series is perfectly (positively) correlated with every other. High positive values of R for both wage-rate and unemployment movements will provide necessary conditions for concluding that the labor market is effective in allocating labor on an intrafactor basis. This can be done on an industrial, occupational, and geographical basis.

From unemployment and income data for eight industries (see Table 1) the following results are obtained.

1. Based on predicted variances of 0.7495 (assuming intersectoral correlation of zero) and 3.5074 (assuming perfect correlation between sectors), an R value of .8809 is obtained from the unemployment series (the actual variance is 3.1788).

2. Based on predicted variances of \$810 and \$4,419, an R value of .5891 is obtained from the income series (the actual variance is \$2,936).

Note: These are obtained from first differences to avoid serial correlation problems.

However, the standard deviation of sectoral wage rates, increases (in 1960 prices) increases from \$469 in 1948 to \$757 in 1960, which seems

Table 1. Unemployment Rates and Compensation per Full-Time-Equivalent Employee, by Industry, United States, 1948-60

Industry	Weight (α) (1954)	Unemployment Rate (per cent)												
		1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Mining	.0184	3.0	8.5	6.7	3.8	3.4	5.0	12.3	8.2	6.5	5.5	9.6	8.6	8.5
Construction	.0624	7.6	11.9	10.7	6.9	5.5	6.1	10.5	9.2	8.2	9.1	12.9	11.3	11.4
Durables	.2163	3.5	7.5	5.3	2.6	2.4	2.0	6.6	4.0	4.0	4.3	9.8	5.5	5.7
Nondurables	.1627	3.6	7.0	6.0	4.0	3.2	3.1	5.7	4.4	4.4	4.5	6.9	5.1	5.3
Transport	.0641	3.0	5.2	4.1	1.9	1.9	1.8	4.8	3.5	2.4	2.8	5.2	3.8	4.0
Trade	.2543	4.3	5.8	5.8	3.7	2.1	2.0	5.2	4.3	4.1	4.2	6.4	5.5	5.6
Finance	.0526	1.6	1.8	2.0	1.3	1.5	1.6	2.0	2.1	1.4	1.8	2.9	2.6	2.4
Services	.1692	3.5	5.1	5.0	3.1	2.6	2.4	4.0	3.8	3.2	3.1	4.2	4.0	3.8
Total ^a	1.0000	3.8	6.4	5.6	3.3	2.6	2.5	5.6	4.4	4.0	4.2	7.0	5.3	5.4

Industry	Weight (α) (1954)	Compensation per Full-Time-Equivalent Employee (dollars)												
		1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Mining	.0194	3593	3421	3755	4231	4415	4756	4806	5189	5529	5750	5755	6137	6329
Construction	.0658	3265	3358	3506	3900	4182	4429	4516	4647	4925	5209	5357	5596	5877
Durables	.2280	3298	3386	3689	4103	4369	4629	4714	5030	5310	5563	5789	6152	6332
Nondurables	.1714	3039	3102	3298	3549	3731	3916	4047	4239	4473	4708	4871	5137	5287
Transport	.0646	3657	3773	3929	4249	4474	4677	4800	5021	5332	5644	5915	6254	6458
Trade	.2430	2916	2990	3146	3291	3406	3567	3695	3851	4019	4191	4320	4516	4689
Finance	.0526	3109	3209	3412	3569	3719	3917	4121	4299	4493	4692	4907	5287	5658
Services	.1552	2158	2219	2275	2437	2618	2755	2878	2963	3106	3262	3383	3566	3761
Total ^a	1.0000	3001	3075	3261	3523	3717	3913	4032	4226	4448	4666	4834	5103	5297

^aComputed on basis of 1954 weights.

Sources: Unemployment data [17]; income data [15].

to imply that the dispersion of sector wage rates has increased over time.

From the occupational data the R value for unemployment rates is .8917, but from the income data the R value is .0244. Thus, there is an instance of inefficient factor allocation.

For the geographic data the R value for unemployment rates .8905, and from the income data the R value is .8011. The sufficient conditions are also satisfied. The respective standard deviations of the distribution of real-wage rates for the years 1948 and 1960 are \$251 and \$291. Also, the rank order of real-wage rates, the rank-order correlation between 1948 and 1960 is .9524, which is significant at the .05 level.

Using this data and these techniques, the author similarly disposes of the structural unemployment question. In general, if all sectoral unemployment rates move with the business cycle, unemployment rates move with the business cycle, unemployment is due to deficiencies of aggregate demand. This has been the case in the United States. It is further suggested that the sector increase of the unemployment rate is due to the failure of the labor market to provide a setting for efficient interfactor allocation, but, the author feels, it is not correct to argue that the labor market has failed on an intrafactor basis.

Charles A. Myers, "Labor Market Theory and Empirical Research", Chapter 20
The Theory of Wage Determination.

Both Marshall and Hicks pointed out that there are imperfections in the labor market which hinder or slow down the competitive equalization of wage and nonwage advantages. Nevertheless, there was a widespread view among labor economists in the U.S. about 1936-1950 that economic theory made unrealistic assumptions about the labor market. This feeling led to a number of labor market studies during this period.

The overall impression of the earlier studies (1936-41), made during periods of considerable unemployment, was that labor markets were imperfect and were operated in haphazard fashion, with movements seemingly purposeless. That is, there was no link between mobility and equalization of net advantages among different jobs. Movement seemed to be induced by decline of job opportunities in one area, plant or occupation and availability or expansion of opportunities elsewhere rather than by wage differentials. But once employed, workers considered themselves outside the market and did not constantly look for better alternatives. Choices were usually posed as between unemployment, on the one hand, and a specific job opening, on the other, rather than between better and worse jobs.

On the other hand, a survey of 6 cities over the 1940-50 decade revealed that the labor force was (1) mobile enough to meet broad structural changes in the demand for labor and (2) sufficiently flexible to adapt to the expanding and contracting volume of job opportunities.

About 70 per cent of the job shifts were voluntarily undertaken and half of the shifts involved complex changes -- i.e., changes of employer, occupation and industry.

Furthermore, movements seemed consistent with predictions of theory -- i.e., from lower to higher paying jobs, with wage differentials useful in allocating labor supply.

"The striking fact is that despite the barriers to voluntary movement... there was considerable movement when the economy provided opportunities to move to more attractive jobs in expanding industries and occupations during the decade 1940-1950."

INTERINDUSTRY

D. E. Cullen, "The Interindustry Wage Structure," American Economic Review, June, 1956.

Most studies of interindustry wage differentials have stressed their dynamic nature, or "pliability" (Dunlop). Only Sumner Slichter, employing rank correlation instead of dispersion of absolute or percentage changes in wages, concluded that interindustry wage structure had considerable stability over short or moderately short periods. This study suggests that such indeed is the fact, and for a 50-year period.

Methods. Rank correlation and three measures of dispersion are used here. The Census of Manufactures includes data for all manufacturing industries from 1899-1950 in the form of average annual earnings. Annual earnings have obvious drawbacks as against hourly rates, but sample studies made for three different years indicated that the two earnings structures were nearly identical when compared by rank correlation.

Rankings. Rank correlations were computed for a sample of 84 manufacturing industries, 20 per cent of the total, which employed, in 1947, 29 per cent of all production workers in manufacturing. The sample includes all the industries for which comparable data are available for all Census years from 1899.

The general impression given by Table II is of surprising uniformity. Slichter's 20-industry sample yielded correlations between .7 and .9 for 23 years or less. By this yardstick, the much larger sample used in this study is remarkably stable, for the 1899-1947 correlation coefficient of .73 is precisely the same as Slichter obtained for a period

TABLE II

Correlation of Structure of Annual Earnings in 84 Industries
in Census Years, 1899-1950

Years compared, 1899 base	Coefficient of rank correlation	Years compared, various bases	Coefficient of rank correlation
1899:1904	.94	1909:1914	.92
:1909	.89	:1919	.84
:1914	.87	1919:1929	.88
:1919	.75	:1933	.68
:1921	.79	:1939	.83
:1923	.77	:1947	.85
:1925	.77	1929:1933	.72
:1927	.75	:1935	.88
:1929	.75	:1939	.88
:1931	.68	1939:1947	.94
:1933	.64	:1949	.92 ^a
:1935	.72	:1950	.88 ^b
:1937	.75		
:1939	.74		
:1947	.73		
:1949	.65 ^a		
:1950	.66 ^b		

^a70 industries.

^b76 industries.

Source: Supporting data, furnished upon request, from U. S. Bureau of the Census, Census of Manufactures: 1947, Vol. II, Statistics by Industry, and Annual Surveys of Manufactures, 1949 and 1950.

only half as long (1923-46).

As for the effect of the business cycle, the picture emerging from Table II is not the severe jolt dealt by the depression of the '30s but the rapidity with which the structure recovered its normal configuration. The rate of change in 1929-39 was no greater than for most of the other decades. The inflationary period following World War II had no appreciable effect on the interindustry wage structure.

Of the 21 industries in the upper quarter of the wage structure in 1899, 14 were still in the high-wage quarter in 1947. Similarly, 15 of the lowest 21 in 1899 were in the low-wage quarter in 1947. Moreover, 10 of the 15 low-quarter industries remained in the same quarter in all of the 16 census years of the 1899-1947 span, whereas only three of the 14 high-wage industries showed the same stability.

These findings are not inconsistent with Dunlop's. The 84 industries which yield such a high rank correlation coefficient show at the same time a wide disparity in both absolute and percentage increases in average annual earnings.

Dispersion. The general impression given by Table III is again one of long term stability. No substantial narrowing of differentials has occurred. However, dispersion was repeatedly, if only temporarily, affected by extremes of the business cycle and, surprisingly, in the same direction in both cases: compression. There was contraction in the two most severe depressions (1921-22 and 1929-33) and in full employment (the 1940's, at least until 1947). A plausible hypothesis might be adduced from the tendency for producer goods industries to be

TABLE III

Dispersion of Structure of Annual Earnings, 1899-1950

Year	84 Industries			High-wage and low-wage industries of 1899	
	Interquartile range \div median \times 100	High-low per cent differential ^a	High-low dollar differential ^b	Per cent differential ^c	Dollar differential ^c
1899	27.4	162	209	162	209
1904	30.0	163	229	162	225
1909	25.7	159	241	153	216
1914	25.1	160	277	153	246
1919	23.5	172	597	155	484
1921	21.7	155	519	141	391
1923	23.2	159	577	148	469
1925	24.2	155	557	145	462
1927	25.5	153	550	146	477
1929	24.8	158	597	155	561
1931	21.1	151	440	133	306
1933	22.3	153	362	135	252
1935	19.8	160	463	139	319
1937	27.9	175	637	163	534
1939	30.1	175	634	153	474
1947	25.7	151	1015	143	868
1949 ^d	23.0	156	1175	143	943
1950 ^e	25.4	156	1262	149	1109

^a For each year, the median of the average annual earnings in those industries forming the top quarter of the earnings structure divided by the median of the average annual earnings in those industries forming the lowest quarter of the earnings structure.

^b For each year, the absolute difference between the medians described in (a).

^c For each year, the differential between the median earnings in the 21 industries which ranked highest in 1899 and the 21 which ranked lowest in 1899 — regardless of the relative position of these industries in subsequent years.

^d 70 industries.

^e 76 industries.

Source: Same as Table II.

in the high wage category, and consumer goods in the low wage. Earnings in producer goods industries could be expected to suffer a relatively large drop in a severe depression. On the other hand, these high-wage industries were the targets of organizing drives in the late '30s, and it is possible that earnings rose more rapidly then because of union pressure, accounting for the widening of dispersion.

Compression did occur from 1937 and 1939 to the postwar years. However, in the context of the whole 50-year period, this emerges as a return of the structure to its "normal" pattern of dispersion. Differentials were greater in 1937 and 1939 than in almost any other census year, and the subsequent narrowing merely returned them by 1950 to the structure of the 1920's.

Equalization of Earnings. The evident weakness of any tendency toward long-run equalization of earnings is the most impressive indicator of the stability of the interindustry wage structure. No theory of the labor market thus far suggested would lead one to expect the spread between the high- and low-wage industries of 50 years ago to increase fivefold in absolute terms, or to decrease to such a moderate extent in relative terms, over half a century (last two columns of Table III).

Qualifications

1. It cannot be assumed that differentials in nonmanufacturing industries behaved the same as the manufacturing industries in this study.
2. The sample may be biased because of the basis for selection: the continuity of data over 51 years. Many new industries were automatically

excluded -- but not all, since those which adapted, like motor vehicles, are included -- as were industries that disappeared in this period. A comparison of dispersion in all manufacturing industries with our sample, for 1939, indicates that the sample understates dispersion, at least for 1939; the reason lies, surprisingly, in the sample's overstatement of average earnings in low-wage industries.

3. Average annual earnings are directly affected by the skill mix of each industry's labor force. It is therefore possible that interindustry differentials in average earnings are determined solely by skill differentials. It is not likely, however: according to Ober, the skilled-unskilled wage spread narrowed sharply from 1907 to 1947; and Slichter found that, measured by rank correlation, the interindustry structure of the hourly earnings of male unskilled labor remained relatively stable over the 1923-46 period, suggesting that the stability of all-worker differentials is not primarily a function of skill mix.

S. Lebergott, "Wage Structures," Review of Economics and Statistics, November, 1947.

Part I contrasts the structures of manufacturing earnings by industry in the United States and several other countries. Data on average hourly earnings in the U.S. and Canada in 1945 showed strikingly similar wage structures: for any one of 31 industries, the Canadian figure could be deduced accurately from the American (Table 1). The correlation with other countries was also high; even the Russian pattern was surprisingly similar:

Correlation between United States and--

Canada (1945)	.94
United Kingdom (1945)	.89
Switzerland (1945)	.87
Sweden (1943)	.71
USSR (1937)	.32 (.92 excluding boots and shoes and printing)

To give some idea of the magnitude of these correlations: within the United States, the following correlations were obtained between national annual earnings of wage and salary earners by industry and the regional patterns:

Northeast	.90
North central	.90
South	.941
West	.86

Part II compares median incomes of male operatives and male laborers in the United States for 1939 by manufacturing industry: the relation is close and linear. The relationship for male and female operatives is less precise and possibly curvilinear.

1. This figure is probably too high.

The correlations between earnings of male operatives and laborers by region were as follows:

Northeast	.97
North central	.82
South	.76
West	.78

For male operatives-female operatives, correlations were much lower except in the South:

Northeast	.84
North central	.65
South	.93
West	.33

Why should the correlation be so high in the South? Pressure for rationalization of the wage structure -- desired by management and labor even in the absence of unions -- generally comes from male workers; women have less bargaining power, less leverage. But this may not be true in the South, where male laborers are commonly Negroes, many of them only part time in industry, and where the role of women, who participate more continuously in the labor market in the South, is relatively more important. Perhaps for this reason, the male-female differential for operatives is more systematized than in other regions.

Part III analyzes the structure of occupational earnings in six industries; scattergrams charting the correlation of industry wage structures for selected regions or cities with the national average for 1943, indicate that there is a basic characteristic structure which is maintained in many cities and regions with only slight differences.

Part IV compares occupational wage structures of five industries in 1900 and 1940 including all occupations for which data were available, and suggests (a) striking similarities over almost one-half a century

and (b) a decline in the percentage margin between high and low rates over the period. Correlations between rates in 1900 and 1940 ranged between .69 and .94, with little difference between nonunion and union industry. The narrowing of the gap within industries is indicated by the degree of inverse relationship between 1900 rates and the percentage change from 1900-40: $-.89$ for textiles, $-.96$ for foundries and machine shops. The building trades were the notable exception, with a correlation of only $-.21$.

Doris M. Elsemann, "Inter-Industry Wage Changes, 1939-1947," Review of Economics and Statistics, November, 1956.

A study of 57 manufacturing industries, all those for which Census Bureau output indexes comparable to Bureau of Labor Statistics hours and earnings data were available, yielded the following results:

1. The industries which had a higher earnings level in 1939 had absolutely larger wage increases up to 1947, but a smaller increase in percentage terms, than the industries which started from lower levels. The correlations were .62 and -.82, respectively. Wage increases were largely in the form of flat increases, and interindustrial differentials decreased by 30 per cent over the period (as measured by the standard deviation as a percentage of the mean).

2. Output and employment changes had a significant correlation with absolute wage changes, but the significance disappeared when the influence of the original level of earnings was removed.

3. Productivity changes were not significantly related to either absolute wage increases or relative increases. Hence there was a strong negative relationship between changes in productivity and changes in unit labor costs. Nor was there any statistical significance to the relationship between productivity and output changes, or productivity and employment.

4. The industries where wage costs constituted a large part of total costs had, unexpectedly, a greater absolute increase in wages. But this relationship was significant only after the influence of the original level of earnings was removed.

5. The relationship between wage changes and unionization was not

close, although the data on union strength were unsatisfactory, since they were in the form of very wide class intervals.

6. Computation of changes in unit labor costs, with 1939 hourly earnings and the change in productivity as independent variables, indicated that the dynamic industries which paid high wages and experienced high productivity gains achieved a lowering in unit labor costs in real terms at a time when real wages in manufacturing were increasing faster than productivity.

L. Earl Lewis, "Wage Dispersion in Manufacturing Industries, 1950-55,"
Monthly Labor Review, July, 1956.

The dispersion of straight-time average hourly earnings of production workers has tended to contract in nearly all industries.

Interindustry Differences. In 31 industries in 1954, employing over 12½ million factory workers, indexes of dispersion of earnings (the value of the interquartile range as a per cent of the median, multiplied by 100) ranged from nine in the motor vehicle industry to 62 in full fashioned hosiery. For 19 of the industries, the index lay between 20 and 35.

Factors Related to Dispersion. (a) There was no significant correlation between wage levels and dispersion among industries. (b) the composition of the labor force had an obvious effect in that dispersion was lower in those industries which employed predominantly a single skill category -- e.g., mostly skilled workers, rather than an equal number of skilled, semiskilled, and unskilled, or a large proportion of women, since women's earnings, mainly in semiskilled or unskilled work, had less dispersion than men's. (c) Incentive pay increased dispersion. Of the six industries with an index of dispersion over 40, four employed half or more of the total work force on an incentive basis. Dress manufacturing, with its predominantly piecework system, had an index of 57. Motor vehicles, with the lowest index, had only a minor proportion of incentive workers. (d) Geographical differentials also helped to account for interindustry differences in dispersion. Industries widely scattered geographically had a wider range of earnings distribution. (e) Other factors: earnings were usually higher in larger companies,

in larger communities, and in companies with collective bargaining agreements. (These are often overlapping categories.)

Postwar Trends. In 17 selected industries over the period 1945-55 (a) the values of the interquartile range increased with the sharp rise in the general level of wages; (b) relative dispersion decreased. Many wage adjustments in the postwar period were in uniform cents-per-hour terms. Minimum wage laws had some influence in raising the lowest-paid industries. And collective bargaining, notably in basic steel, tended to reduce or eliminate regional differentials, thereby reducing inter-industry differentials.

Skewness. The measure of skewness used was derived by subtracting the median from the mean, dividing the result by the median and multiplying by 100. Among the industries studied, this measure ranged from -0.6 to 9.5. Almost all the industries were slightly skewed to the right -- the mean was 1 to 15 cents an hour greater than the median.

Harold M. Levinson, "Pattern Bargaining: A Case Study of the Automobile Workers," Quarterly Journal of Economics, May 1960.

A field study was made of 85 firms in the Detroit area which had agreements with the United Automobile Workers, excluding the three major motor vehicle producers, to explore the nature and extent of pattern bargaining by the United Automobile Workers in the period 1946-57.

Table I shows that deviations from the pattern set by agreements with the Big Three, measured in terms of equivalent benefits to the worker, were considerable and increasingly prevalent over time. Over the entire 11 years, only 26 per cent of the companies in the sample, employing 40 per cent of the employees, followed the pattern, either exactly or in equivalent settlements. More often the deviations were below the pattern rather than more generous. A more detailed breakdown, in Table II to VI, clearly indicates a close relationship of pattern adherence to the size of firm and to the relationship of the firm to the automobile industry. Over the whole period, 38 per cent of the automotive firms negotiated pattern agreements, compared with only 11 per cent in the nonauto sector.

The role of the major variables in the union's wage policy was investigated largely through interviews with union representatives.

(a) There was overwhelming agreement among the negotiators that no consideration was given to possible wage-employment relationships -- largely because they were too uncertain -- unless the pattern settlement threatened to put the firm out of business (the crisis situation). But even when the union was convinced that a crisis existed, perhaps after an examination of the employer's books, and particularly by the existence of substantial unemployment among the company's work force, two other barriers operated against a below-pattern settlement: the size of the firm, and whether or not it

was in the automotive industry. I.e., the union was vitally concerned with establishing the key bargain as the "competitive" standard for the automobile industry, at least in the Detroit area: with standardizing it and having it accepted by other firms. But the threat to the union's overall bargaining strategy became less acute the smaller the firm and the less closely related to the automotive industry.

Concessions were nevertheless made on wages and fringes in some cases. More frequent were efficiency adjustments: raising production standards, reducing rest periods, and other factors to hold down unit labor costs, which were not reflected in the contract itself.

(b) Considerations of equity among union members and organizational strength, the "political" factors, did not exclude flexibility, as the fairly common incidence of below-pattern agreements indicated. The reason lay in the structure of the union, with major responsibility for negotiations resting with an official whose position rested on a political base much broader than a single bargaining unit.

Conclusions. The evidence does not provide unqualified support for either of the two major hypotheses on trade union policy. Ross's "political" hypothesis stressed the influence of group pressures, the most important being the feeling of union members that they should obtain the pattern as a matter of equity. Dunlop's "economic" approach considered the union's policy as oriented toward maximizing some income variable, most logically the total wage-fringe bill; hence the union would be primarily concerned with the "employment" effects of its wage policy.

For wage increases up to the crisis or pattern level, the policy of the Automobile Workers was consistent with Ross's point of view. The

union considered the employment effects sufficiently uncertain, and the members' interest in equity sufficiently important, to ignore the employment effects. Also, the fact that above-pattern agreements were so rare suggests that equity considerations were dominant, and economic considerations of maximization of income secondary.

However, in a crisis situation, the point of conflict between economic and political factors, the record gives considerably stronger support to the economic point of view. Considering the entire sample over the entire postwar period, concessions were more the rule than the exception. There was also evidence that union officials were not so concerned with political repercussions that they insisted upon a pattern contract in the face of adverse economic conditions.

Union leaders were less affected by political considerations than Ross suggested. On the other hand, the employment effects stressed by Dunlop arose only in crisis or near-crisis situations.

George Seltzer, "Pattern Bargaining and the United Steelworkers," Journal of Political Economy, August, 1951.

Recent attacks on the monopoly power of unions, and specifically on pattern bargaining by the United Steelworkers, raise a number of questions, first on the facts and then on their policy implications.

Basic Steel

Patterns. Collective bargaining from 1946 to mid-1950 contained four "rounds" of negotiations. In the first three, the key bargain was between the union and U.S. Steel; in the fourth round, with Bethlehem. Conformity with the key bargain was greatest in the first, least in the fourth round. In each of these rounds, there was a lengthy strike and significant government intervention. In the 1948 round, the union was constrained from striking by "no-strike" clauses in its contracts, suggesting that the "coercive" power of the union did not wholly explain the uniformity in timing and amount of wage increases in that round.

Conformity with the pattern was noticeably greater among integrated steel producers than among semi- and nonintegrated producers, with the latter instituting smaller wage increases and less generous fringe improvements. Pension provisions in the key bargain in 1949 were adopted by almost all integrated firms, but by only 85 per cent of semi-integrated and 55 per cent of the nonintegrated firms. The uniform minimum wage established in 98 per cent of integrated producers after the last round was adopted in only 42 per cent of semi-integrated contracts and 34 per cent of nonintegrated.

Market Forces. From 1913 to 1932, before unionization, the record

shows general agreement in the timing and amount of wage changes, under the leadership of U.S. Steel, and substantial identity in common labor rates. Uniformity of wage behavior is rooted in the product and labor market structure of the industry, with price leadership and the basing point system at the core.

Government Action. Since 1933, government policies have helped to maintain and extend wage uniformities. Under the National Recovery Act, the Walsh-Healey Public Contracts Act and the War Labor Board, wage scales were equalized within geographical districts and then among companies. Government intervention in subsequent strike situations brought about almost universal acceptance of uniform increases and of noncontributory pensions.

Collective Bargaining. The union has certainly played a part in prompt, industry-wide transmission of wage changes. But it has merely supplemented the more important influences of the market and of governmental action. It is significant that even in periods of full employment, the union has not used the key bargain as an inflexible standard.

Effects of Patterns. The general wage increases of 1937, 1941, and 1946 were of the cents-per-hour type. However, subsequent increases were mixed: uniform percentage increases in integrated firms; in nonintegrated firms, the same absolute increase in the minimum rate but smaller changes in the other rates. The general long-run effect has been to narrow differentials but the equalization of minimum rates by government policy is probably of greater importance than union action.

Other Areas

Collective Bargaining. Agreements of the Steelworkers with manufacturing firms outside the basic steel industry from 1946-49 were predominantly lower than the key steel bargain on wages and severance pay, but generally higher on other fringe benefits: vacations, holidays, shift premiums. These deviations are explicable in terms of sensitivity to local labor market factors. For nonsteel firms in the basic steel centers, it was local labor market factors which induced conformity with the key steel bargain. In nonsteel areas, union policy went along with deviations -- which were greater in the areas more distant from the steel centers -- again, in response to local market forces.

A uniform wage policy has many advantages for the union. Nevertheless, in conflict with market conditions -- e.g., an employer's inability to pay -- there are numerous instances in the record in which the union negotiators explicitly eschewed rigid adherence to the key bargain.

Conclusions. Recent views stressing the primarily political character of unions treat collective bargaining as if it occurred in a political vacuum. Contrary to Ross, geographical and industrial factors have not been rendered impotent by the emergence of collective bargaining. Ross also considered that "employment effects" played a minor role in union wage policy; this study, revealing widespread downward deviations from the key bargain, even in a period of generally full employment, suggests the contrary. This is confirmed repeatedly by the explanations of union negotiators for below-par settlements. The Steelworkers' concern for preserving the jobs of its members indicates that the fears created by pattern bargaining are unjustified.

Benson Soifer, "On Union Rivalries and the Minimum Differentiation of Wage Patterns," Review of Economics and Statistics, February 1959.

The purpose of this paper is to reformulate the theory of pattern bargaining to take account of the increased importance of variations. The concept of minimum differentiation, drawn from the theory of monopolistic competition, will be proposed to explain both the uniformity and the variation in wage patterns, by reference to the impact of union rivalries and coalitions. The aim is to explain behavior which cannot be satisfactorily explained either by market forces (which play a major role only at the limits and a permissive role within the limits) or by the hypothesis of imitation.

Union Rivalries. Union rivalry simultaneously creates pressures for uniform wage changes within the union's bargaining units and for diverse changes between rival unions. Differences in the type of contract are an ideal area for differentiation.

Escalator Increases. A simple example of a differentiated wage pattern is that established by automatic wage escalator increase in the leader unit in a period of rising prices, while the follower units continue to adjust wages by negotiation. Several alternatives are available to the follower: (1) restoration of the pre-existing relationship, a temporary catching up; (2) an increase not only covering previous pattern increases but anticipating the escalated pattern increase for the next year ("defensive" rivalry); (3) an increase sufficiently large to compensate for both past and expected losses as against escalated wages ("active" rivalry); and (4) increasing the frequency of wage adjustments, to follow the escalator pattern more closely.

The Auto-Steel Orbit. The United Automobile Workers and the United Steelworkers, with their smaller allies and rivals, operate in the automobile, steel, aluminum, agricultural implement, rubber tire, electrical equipment and flat glass industries. The rivalry between the two giant unions for the leadership of the CIO was keen. In addition, there was competition between them and smaller unions in the agricultural implement and aluminum industries.

Wage movements in the orbit have been strikingly uniform. However, several very large firms have developed sub-patterns within the overall pattern. These are particularly significant because they cannot be attributed to uniform market changes. In 1945-48, the key agreements with U. S. Steel and General Motors embodied almost identical wage changes, and, over the three rounds, were followed with minor changes by General Electric, the big four rubber companies, International Harvester, and the Aluminum Company of America.

After 1948, the two unions diverged sharply in contract patterns. The Automobile Workers signed a long term contract with GM, just before the outbreak of the Korean War, including (1) a cost-of-living escalator clause, which adjusted wages quarterly on the basis of very small fluctuations in the Consumers' Price Index and (2) an annual "improvement factor" increase of four cents per hour. The United Steelworkers' agreement in basic steel, imitated throughout its multi-industrial jurisdiction, provided, very differently, for annual wage negotiations. Nevertheless, the total wage increases under both contracts over the next three years were, again, almost identical. Substantial differences in the timing, amounts and form of wage changes cancelled out. The pattern was established by the automobile escalator agreements during the period of rising prices, and by the steel

industry during the period of price stability, with both unions negotiating agreements of the "active" rivalry type. Among the smaller units, coalition members adopted "follower" differentiations and rivals negotiated nominal changes. Almost every variation of an escalator pattern occurred.

The conclusion was, therefore, that union rivalries created minimum differentiation of wage patterns rather than imitation.

Benson Soffer, "The Effects of Recent Long-Term Wage Agreements on General Wage Level Movements: 1950-1956," Quarterly Journal of Economics, February, 1959.

Before 1950, almost all collective agreements provided for renegotiation of wages at least once a year. After the outbreak of the Korean war, long-term agreements providing for automatic interim wage increases gained wide acceptance. A General Motors contract, as early as 1948, embodied the following features: renegotiation of wages in three years; escalator clauses providing frequent quarterly automatic wage changes geared to the Consumers' Price Index; additional annual automatic increases, fixed in specific cents-per-hour. One or more of these provisions was widely followed in escalator agreements which became particularly popular after the outbreak of the Korean war, although the traditional practice of negotiating wage changes still prevails for the majority of organized workers.

Have the GM-type agreements affected movements of the general wage level since 1950? The following hypotheses will be tested:

1. During periods of rising prices, automatic wage changes:
 - (a) lead, but do not exceed negotiated changes in closely related wages;
 - (b) lessen the short-term restraining influences in industries where wages tend to "lag"; and (c) increase the sensitivity of the general wage level to price-level changes.
2. In periods of price stability, escalation will not reduce wage adjustments.
3. In such periods, the annual deferred increase sets a floor under negotiated wage changes under traditional short-term agreements.

The Evidence. Comparisons were made of chronologies of automatic

and negotiated wage increases in four selected industry groups: auto-steel, textiles, railroads, and printing. These were compared with general wage movements.

Hypothesis 1 (a) was tested by an analysis of the experience of the steel industry, which used the traditional type of agreement, and the closely related automobile industry. In all the industries comprising the auto-steel orbit, GM-type agreements established the underlying pattern of general wage increases through the Korean inflationary period. Deviations were insignificant.

For hypothesis 1 (b), the textile, printing, and railroad experiences were relevant: escalator clauses were adopted in these industries where, for different reasons, conditions were less favorable for wage increases than in autos and steel. Escalated wages led the upward movement.

For hypothesis 1 (c) -- that GM-type agreements increase the sensitivity of wages in general to price changes -- general wage movements were studied for inflationary periods before and after the adoption of escalation. The evidence supported the hypotheses. Table 1 shows that inflation reduced the level of real wage rates before 1950 but not thereafter. Table 2 shows an increasing sensitivity of wages to price rises in the three years 1954-1956, in settlements involving 1,000 or more employees in all industries.

Hypotheses 2 and 3 were tested by a study of 1954, when economic conditions were unfavorable for wage increases and when the "floor" influences of the GM agreement could be observed, and 1953 and 1955 when automatic increases were adapted to negotiated increases, rather than the reverse as observed during the Korean war.

TABLE 1

Percentage Increase in Consumers' Price Index and
Percentage Change in Real Basic Wage Rates in
Manufacturing in Recent Inflationary Periods

	<u>Price change</u>	<u>Real basic wage- rate changes</u>
July 1941 - July 1942	11	-1
June 1946 - June 1947	18	-6
June 1947 - June 1948	10	-2
Jan. 1950 - Jan. 1951	8	none
Jan. 1951 - Jan. 1952	5	none
Jan. 1956 - Jan. 1957	3	+3

Conclusions. The GM formula appeared to raise the level of wages generally in periods of rapid price rises, but did not hold wages down in other periods. When negotiated increases moved ahead, supplementary increases were added to the automatic increases in the GM-type contracts. The assumption that wages are "sticky," that the duration of collective agreements tends to hold down wages in inflation (Milton Friedman), is not supported by the evidence. The "escalator" features of the GM-type formulas make the general level of wages highly sensitive to even small fluctuations in the Consumers' Price Index.

Lloyd Ulman, "Marshall and Friedman on Union Strength," Review of Economics and Statistics, November, 1955.

...Certainly in our own time and country there exists ample evidence of the importance of the economic ties binding different organized groups in the same industry.... In construction, unions in the six so-called basic trades (the operating engineers, carpenters, common laborers, teamsters, iron workers, and cement finishers), whose members work for the same employers (the general contractors), bargain as a group in some communities. The other trades bargain with their respective subcontractors. The latter thus deal with only one union each, but to such employers the cost of union labor constitutes a very high proportion of total cost. Moreover, so-called national contractors frequently influence local wage settlements involving both general contractors and subcontractors whom they hire.¹⁷ And of course the existence of local building trades councils and contractors' associations testifies to awareness on each side of the interrelatedness of all interests.

The railroads have a long tradition of "pattern increases" both within and between the operating and the non-operating groups of unions. Since 1937 all the operating crafts received increases totalling \$1.245 per hour, while all the "non-ops" received \$1.234.¹⁸ Although, with one exception, every one of the nine "wage movements" which occurred since 1937 involved government intervention, the uniform cents-per-hour pattern of settlement owes its remarkable vitality to the support granted it by the unions and the carriers. When, in 1947, the differential between yard foremen and helpers was increased "in an effort to correct a supposed inequity," the Locomotive Engineers claimed that this created a new

inequity in the differential between the yard engineers and the yard foremen. Their counsel warned that "the Carriers cannot expect the engineers' organization to watch the ground supervisors' basic rate rise and alter the differential, unless the engine supervisor's rate also rises. If they expect this they are in for a rude awakening." When, in 1954, the Engineers sought to increase the existing differentials between their craft and the other railroad groups, the carriers were wide awake. Their case in opposition to the Engineers' demand emphasized the importance of the "pattern" in collective bargaining on the railroads; one of the spokesmen said that "if the demand of the Engineers for a percentage increase should be granted by this board, it is certain that the remainder of the industry's operating employees would be keenly dissatisfied with their settlements. They would surely make further demands that the same amount of money increase be granted to them."¹⁹

It is interesting to note that, in the shipbuilding industry, collective bargaining is conducted between the employer and the local metal trades council in some shipyards, while in others the workers are organized in industrial locals. Local trades councils of different crafts also exist in printing, but joint bargaining between allied printing trades councils and employers is not typical (although not unknown). In both the newspaper and the book-and-job branches of this industry, however, the phenomenon of what Dunlop has termed "wage leadership" might be observed: "...the negotiations of the strongest craft frequently set the stage for the others, which then get approximately the same settlement."²⁰ According to Emily Clark Brown, insistence by the followers in the book-and-job branch on the reestablishment of "proper" differentials

after a wage increase is granted to a leader is responsible for the fact that "indexes of changes in wage rates for the separate crafts have moved closely together since 1907."²¹ But each party's recognition of interdependence has typically led it to oppose joint negotiations in this industry. "Stronger unions hesitate to give up their special advantage in bargaining by cooperating with the weaker ones, while the weaker sometimes fear inadequate attention to their interests in joint action." Moreover, employer interest in separate bargaining is clearly motivated by concern over intercraft relationships. According to Mrs. Brown, "Granting a demand of one craft at a crucial moment may prevent the development of a movement for more unity and militancy."²² Case studies of collective bargaining in two firms, each negotiating separately with several craft locals, some of which were in the printing trades, reveal how the employer's awareness of the leader-follower relationship influences his negotiating policy when dealing with any one local. The following quotation from the study of the Marathon Corporation is clearly pertinent to our problem:

The small number of members of the printing unions, coupled with their important position in Marathon's connecting operations, suggests that the company could afford to comply with almost any demands of these unions, no matter how unreasonable, simply to avoid a stoppage. In practice, however, each of the unions watches the other negotiations carefully, and the company attempts to grant concessions which are relatively uniform.²³

In view of what might be termed the "complementarity effect" of unionism in other groups in the same industry when substitutability between them and the group in question is sufficiently low, and in view of what might be termed the "effective labor-cost ratio effect" when substitutability is sufficiently high, it is probable that the bargaining power of a well-organized craft group is reduced if other groups in the

same industry become organized (in the same or in separate unions). But we have not been describing an actual historic process, for we have assumed that the earliest organized group had been thoroughly organized by the time the other groups in the industries formed unions; historically this condition has rarely obtained. And so long as the older craft organizations remained only partially organized throughout their jurisdictions, employers could and did break their strikes and keep plants in operation by contracting out struck work. Hence the subsequent unionization and cooperation of other groups increased the actual bargaining power of the older organizations at the same time that they might have diminished their potential bargaining power. This explains ^{the origin of many of} our so-called multi-craft unions...

17. I am indebted to an unusually reliable source, Professor Dunlop, for furnishing me with information on collective bargaining in the construction industry.

The writer would agree with Stephen P. Schotka, "Union Influence on Wages: The Construction Industry," Journal of Political Economy, LXI (April 1953), 128-29, that the relevant denominator of the labor-cost ratio in construction is total construction costs, but only if the numerator consists of a larger fraction of the total cost of housing than that accounted for ^{by} a single craft only. If the latter be chosen as the numerator, however, then the more appropriate base would be the total cost of the subcontractor in question, for the general contractor's awareness of the interrelatedness of the different bargains would make it difficult for a minor subcontractor to "pass on" a given wage increase merely because

that wage increase would constitute a much smaller percentage increase in total building cost. Sobotka finds a significant degree of correlation between the extent of organization and relative full-time earnings of skilled building trades workers, but virtually no correlation (.06) for common building laborers (page 134). However, his inference that unions of unskilled labor in this industry were unable significantly to affect the wages of their members overlooks the fact that the frequency of distribution of common labor unions with respect to degree of organization was markedly different from that of the unions of skilled crafts, in that a far greater proportion of unskilled unions than of skilled locals fell in the zero-to-25 (and zero-to-50) per cent organized group. Further, the data used in this portion of Sobotka's argument all refer to 1939, a year of high unemployment; and in periods of high unemployment, unemployment rates among unskilled labor are generally higher than in skilled trades. Professor Dunlop has suggested this latter point to me; it carries the interesting implication that unions composed predominantly of unskilled workers might labor under a greater handicap than others in periods of high unemployment.

18. These figures are inclusive of adjustments made when the work week was reduced from 48 to 40 hours in 1948. Below are listed the awards exclusive of that adjustment.

Awards granted in	Amount of award	
	Operating employees	Nonoperating employees
1937	5 $\frac{1}{2}$ ¢	5 ¢
1941	9 $\frac{1}{2}$ ¢	10 ¢
1942-3	9 ¢	9 ¢
1945-6	18 $\frac{1}{2}$ ¢	18 $\frac{1}{2}$ ¢
1947	15 $\frac{1}{2}$ ¢	15 $\frac{1}{2}$ ¢
1948	10 ¢	23 $\frac{1}{2}$ ¢
1949-52	23 ¢	12 $\frac{1}{2}$ ¢
1952-53	4 ¢	4 ¢
1953-54	5 ¢	5 ¢

Source: National Mediation Board, Arbitration Board No. 192, Case A-4400, In the Matter of a Dispute between Carriers Represented by the Eastern, Western and Southeastern Carriers' Conference Committees and Their Employees Represented by the Brotherhood of Locomotive Engineers, 1954, Brief on Behalf of the Carriers.

19. Ibid., 6-7; transcript of Proceedings, 1320.

20. Robert K. Burns, "Newspapers," and Emily C. Brown, "Book and Job Printing," in How Collective Bargaining Works (New York, 1942), 77, 139.

21. Brown, loc. cit., 156.

22. Ibid., 141.

23. R. W. Fleming and E. E. Witte, Marathon Corporation and Seven Labor Unions, Case Study No. 8, Causes of Industrial Peace Under Collective Bargaining (National Planning Association, Washington, D.C., 1950), 19. See also Charles A. Myers and George P. Shultz, Nashua Gunmed and Coated Paper Company and Seven AFL Unions, Case Study No. 7, same series, 35 and 74.

Sumner H. Slichter, "Notes on the Structure of Wages," Review of Economics and Statistics, February, 1950.

This paper discusses some regularities which occur in the inter-industry wage structure and their implication for the theory of wage determination. The method of the study is to select a number of factors with which hourly earnings might be expected to vary and to compute coefficients of rank correlation between these conditions and the average hourly earnings of unskilled labor in selected manufacturing industries. The factors selected for comparison are as follows:

- X_1 : Average hourly earnings of semi-skilled workers in the industry.
- X_2 : Value added by manufacturing per manhour.
- X_3 : Value of product per manhour.
- X_4 : Ratio of payrolls to income from sales.
- X_5 : Ratio of net income after taxes to sales.
- X_6 : Proportion of women in the industry.

Let W : the average hourly earnings of unskilled workers in the industry

r : coefficient of rank correlation between W and X_1 .

X_1	(direction of relationship)	r
1	positive	.7098
2	positive	.9299
3	positive	.8297
4	positive	.7288
5	positive	.6969
6	negative	.4491

Most of the comparisons are for the years 1939 and 1940. This avoids the effect of the war of the interindustry wage structure, and it also avoids

much of the effect of unionism on the wage structure because collective bargaining was not a firmly established institution in most industries studied at this time.

Further, the interindustry structure of wages has considerable stability during relatively short periods of time. When W for one date is correlated against W for another, the coefficient of rank correlation remains high.

<u>Years of comparison</u>	<u>r</u>
1923 & 1946	.7289
1923 & 1939	.7154
1929 & 1939	.8902
1929 & 1946	.8812

The major conclusion of the paper is that managerial policies are important determinants of the interindustry wage structure. The best evidence of this is the high coefficient of rank correlation between W and X_1 . This suggests that management operates by some rule-of-thumb in determining wage rates for its various classes of employees. Similarly, the high correlation among W and X_3 suggests that management is more disposed to a liberal wage policy when value added per wage earner is high and more disposed to a niggardly wage policy when value added per wage earner is low. Also, the high positive correlation between W and X_4 suggests that management looks after its wage policy more carefully when labor costs are high relative to other costs than when labor costs are low relative to other costs.

David G. Brown, "Expected Ability to Pay and Interindustry Wage Structure in Manufacturing," Industrial and Labor Relations Review, October, 1962.

The following hypothesis is developed and tested: wage level differences among manufacturing industries result primarily from differences in employers' estimates of their future ability to pay. The hypothesis is demand, not supply, oriented.

It is logical that firms able to pay higher-than-average wages without dipping below some minimally acceptable level of profits will do so: to simplify recruitment, increase worker goodwill, reduce turnover, allow greater selectivity in employment, etc. But for the less profitable firm, the disadvantage of high cost outweighs the advantage.

Measurement of Ability to Pay. The ideal figures -- managers' estimates -- are not available, so a substitute measure was formulated on the basis of seven quantitative indexes for 1951-52.

1. Past profitability, measured by the rate of return on sales; neither net worth nor assets data could be obtained by industry.
2. Labor productivity, measured by the ratio of value added to the number of production worker manhours. Total worker productivity data were not available.
3. Structure of the product market, measured by the degree of concentration. Oligopolists are more likely to have higher expectations of their future ability to sustain high wage levels: they are in a better position to pass the costs of higher wages on to the consumer than firms and industries facing strong competition in the product

market; larger than average profits are not likely to be eroded by entry of new firms.

4. The importance of wage costs, measured, in the absence of data on wages as a proportion of total costs, by the ratio of labor cost to value added, and by the ratio of production workers to other employees.

5. Ratio of male to total employment. Firms and industries which do not think that they can afford to hire prime male labor will, it is hypothesized, resort to cheaper female labor.

6. Stability, measured by the average size of firm and the seasonality of employment (ratio of employment in month of highest employment to that in lowest month). Small firms without large reserves of assets, and lacking a variety of products to compensate for changes in demand, will be reluctant to commit themselves to high future wages because their profit position will be more volatile.

7. The dynamic character of the industry, measured by the rate of change in employment. Expanding firms and industries will make liberal estimates of ability to pay higher wages; contracting ones will not.

Other factors are undoubtedly important in assessing future ability to pay (e.g., expected degree of unionization, predictions of consumer tastes, anticipated rate of automation) but quantitative measures of these factors are not obtainable.

Wage Measures. Annual earnings have been chosen as the best available measure of payroll costs and of employee income.

Data on the dependent variable, annual earnings, and on each measure of expected ability to pay were collected for 81 manufacturing industries (Standard Industrial Classification 3- and 4-digit industries)

for 1951-57.

Data for earnings, productivity, production worker employment, and labor costs are averages for the whole period. Profitability data are averages for 1951 and 1957; the sex ratio and seasonality data are averages for 1951, 1954 and 1957; employment per firm figures are for 1954. Changes in employment are the sum of 1956 and 1957 totals divided by the total of production worker employment in 1951 and 1952.

Methods. Pearsonian product moment regression analysis was used after two assumptions required by this technique were tested and found generally valid: (a) Strong curvilinear relationships between wages and each independent variable do not exist; (b) the expected ability to pay variables are not linearly related to each other. As a rough test, simple correlation coefficients were computed between sets of independent variables; two exceptions appeared to the independence assumption: the industries in which labor costs were relatively insignificant (highly capitalized) were also industries in which output per manhour was high; and the industries with large firms in terms of employment were also industries with high concentration ratios. Therefore, in each case, one of the interdependent variables was dropped from the regression equation. With these adjustments, the assumption of linear independence is valid,

Statistical Results. Wages appeared to be generally higher in the industries which were highly profitable, highly concentrated, highly capitalized, highly stable and predominantly employers of male workers.

Correlation between average annual wages and —	Correlation Coefficients	
	Simple ^a	Partial
Value added per manhour	.471 ^b	.093
Degree of concentration	.406 ^b	.326 ^b —
Profits per sales dollar	.411 ^b	.298 ^b —
Production worker employment/ Other employment	-.560 ^b	-.378 ^b —
Payroll/value added	-.168	(c)
Male employment/total employment	.608 ^b	.392 ^b —
Seasonality of employment	-.227 ^b	-.029
Employment per firm	.352 ^b	(c)
Change in employment	.013	-.124

^aSimple correlations are based on a sample of 81 industries except the correlation between profits and wages. That correlation and all partial correlations are based on a sample of 59.

^bSignificantly different from zero at the 95 per cent confidence level.

^cPartial correlations not taken because of strong multicollinearity with another independent variable.

1. The significant simple correlation between earnings and productivity is supported by the fact that eight of the ten top ranking industries in productivity were paying wages above the median of all industries, while none of the lowest ten were paying wages above the median.¹ However, the low partial correlation coefficient indicates that

1. This corroborates the findings of Sumner Slichter, using 1939 data for 13 industries.

productivity and wage differences are not uniquely related.

2. Concentration appeared to be a significant determinant of ability to pay, which in turn creates interindustry wage differences.¹ Twelve of the 15 industries in which the four largest firms accounted for 60 per cent or more of the total value of shipments paid above the median wage; only five of the 15 least concentrated industries did so. The significant partial correlation coefficient indicated that apart from the other ability to pay factors, resistance to wage increases is less in oligopolistic than in competitive industries. (The reason may stem from the common wage policies often found in oligopolistic industries, and the whipsaw tactics of unions, applying pressure to the weakest firm.)

3. The data indicate that better wages are paid by more profitable industries, the same conclusion Slichter reached in the only previous study of the wage level-profitability relationship.² Detailed analysis revealed that the constraint of low profits was a more effective determinant than the permissiveness of high profits: low profits and wages were more typical than high profits and wages.

4. The wage cost indexes used indicate that there is a significant relationship with wage levels: wages are higher in industries

1. A similar conclusion was reached by Dunlop, Rothbaum, Ross and Goldner, McClaurin and Myers and Levinson.

2. The profitability-wage change relationship, on the other hand, does not seem to be unique. When differences in concentration and union strength were accounted for, the independent influence of profits on wage change disappeared (Bowen, Levinson).

where labor costs are not the major costs.¹

5. The sex ratio was found to be a significant index of ability to pay -- wages are significantly higher in industries that are predominantly male -- but this conclusion must be qualified by the possibility that the important determinant is on the labor supply side, rather than labor demand. I.e., the high correlation may reflect not ability to pay, but differences in the necessity to pay high wages to attract the type of labor demanded (heavy manual work requires males).

6. The stability indexes indicate that wages are generally higher in industries where the size of firm is larger and where seasonal fluctuations are relatively small.

7. Rates of change in employment -- reflecting rates of expansion -- did not appear to be a significant index of future ability to pay. A number of reasons argue against a close relationship with wage levels: Unlike the other indexes of expected ability to pay, this was not correlated with any of the other independent variables. Second, interindustry changes in employment were very small in the period studied.

Multiple Correlation. High wage levels and the expectation of high wage paying abilities are typically found in the same industries. The multiple correlation coefficient between wages and six indexes of expected ability to pay is .861, indicating that the chosen indexes explain nearly 75 per cent of the interindustry differences in wages. Whether ability to pay differences are also significant determinants

1. This confirms the earlier findings of Slichter and Dunlop. Later studies which found no relationship between wages as a proportion of total costs and wage changes (Ostry, Ross and Goldner, Elsemann), are not relevant here.

of wage levels in sectors other than manufacturing and in periods other than the 1950's remains to be answered by further research.

Jules Bachman, "Why Wages Are Lower in Retailing," Southern Economic Journal, January, 1957.

Various economic factors have been singled out to explain why wage scales are higher in some industries than others: capital investment per worker; proportion of labor to total costs; movement of employment; productivity; unionization; skill requirements. A brief review of the available evidence indicates how these factors operate and why wage scales are relatively low in retail trade.

Capital Investment Per Worker. Capital investment per worker in corporate retailing was about \$5000 in 1948, as against \$12,000 for manufacturing in 1952. Moreover, in retailing capital investment takes the form of inventories and space, which do not significantly improve the workers' productivity.

Percentage of Labor Costs. Labor costs should be compared not with sales -- because retailing is the last step, and most of the final value of a product is already incorporated in it when it enters retail channels -- but with "value added" by the retailing process alone. Directly identifiable labor costs in 1952 accounted for about five of every eight dollars of net income produced by the industry, a good deal more than the statistic that the retail payroll averages only 10 cents of each consumer retail dollar. Even this figure does not include the labor-compensation of the owner-proprietor, which would bring the total labor costs up to 90 per cent of income originating in retailing, as against about 78 per cent in manufacturing in 1952.

Employment Trends. The rise in retail employment of about three million from 1939 to 1954 was about the same relatively as for the economy as a whole.

Productivity. Productivity can be estimated roughly from income originating in trade, in the national income accounts, and from the number of employees. (It should be noted that the work week is longer in retail trade than in many other industries.) In 1954, the relative income produced per person employed was lower for trade than any other major industrial group, except contract construction and the service industries; it was about one-fourth lower than the figure for manufacturing. It is probable that productivity has increased somewhat with the development of supermarkets, mechanization of handling and transportation, but economies of scale are difficult to achieve where convenience and service play important roles.

Skill and Age. A high percentage of younger workers and of part-time workers, women and minority groups, are employed in trade, reflecting the low skill requirements.

Unionization. Only about 7 per cent of the employees in retailing are unionized (1955), a large proportion of them in the retail food establishments, compared with 55 per cent in manufacturing.

Otto Eckstein and Thomas A. Wilson, "The Determination of Money Wages in American Industry," Quarterly Journal of Economics, August, 1962.

This paper presents an empirical model to explain the behavior of wages in American manufacturing industry from 1948-60. The wage theory advanced and empirically tested is different from the traditional demand-pull and cost-push theories.

Three issues in wage determination have received particular attention: (1) Do unions make a difference in the long-run determination of wages? (2) Do unions strive to maximize some economic variable, or are they primarily political organizations whose leaders strive to assure their survival and strength? (3) If economic variables are important, is it the labor or product market which determines wages? Five hypotheses are advanced and tested and limited conclusions are drawn with respect to the three issues stated above.

Hypothesis I: Wage Rates are Set by a Bargaining Process.

The problem is viewed in terms of the utility functions of union leaders and corporate management, particularly with respect to (1) wage settlements of different amounts, (2) the cost of a strike, and (3) the cost of losing a strike.

Hypothesis II: Wage Determination in a Group of Heavy Industries is Interdependent. A "key group" of heavy industries exhibits a considerable degree of interdependence. This group includes: rubber, stone clay and glass, primary metals, fabricated metals, nonelectrical machinery, electrical machinery, transportation equipment, and instruments. There are extensive input-output connections among them. They are

geographically centered in the Midwest and constitute a weakly linked labor market because of the similarities of skills required. Some unions are bargaining agents in several of the industries. A wage pattern exists, in which autos and steel generally lead. Large corporations with strong market power dominate each industry.

Hypothesis III: Wages are Determined in Wage Rounds. Economic conditions prevailing and expected at the time of negotiations play a particularly important role in wage determination. Since contracts are made for periods ranging up to 5 years, the result is a series of wage rounds: a clustering of settlements in time, often following a similar pattern. (The first three hypotheses are institutional, the last two are economic.)

Hypothesis IV: Both Product and Labor Markets Influence Wage Determination. A union's utility function with respect to wage demands will shift with economic conditions. Similarly, the disutility to management of generous settlements varies with economic conditions.

Hypothesis V: Two Variables, Profit and Unemployment Rates, are Sufficient to Explain Most of the Variation in the Rate of Increase of Wage Rates. For the labor market, unemployment is the strategic variable in determining the division of bargaining power in wage negotiations. The profit rate is the strategic variable in the product market since it affects bargaining power, and reflects the long-run structural characteristics, such as degree of monopoly, of the product market.

Wage Determination in the Key Group

The annual average rate of increase of straight-time hourly earnings in the key group was regressed against profits¹ and the average rate of unemployment for the key groups for each of the 5 rounds since 1948. Even though the correlation has only 2 degrees of freedom, both the coefficients are significant at the .99 level for a single-tailed distribution; the multiple determination coefficient (R^2) is .9975. Profits account for 57 per cent of the total explanation, unemployment for the other 43 per cent. The correlation between the independent variables was fairly low, since neither is perfectly correlated with general prosperity.

Economists are properly skeptical of any result obtained with only two degrees of freedom. Supporting evidence, based on cross sections and time-series studies of individual industries, is presented below. But it must be stressed that the fewness of observations represents historical reality. Sample size could be increased by studying prewar data, but since industrial unions did not achieve their present position until after World War II, the same mechanism would probably not apply.

Individual Industry Time Series. If the hypothesis about the significance of the key group for industry wage determination is correct, time-series analysis of wages in the individual industries should verify the group result. Table 1 summarizes these regressions. Profits and

1. Profits prevailing or expected at the time of bargaining are the relevant figures, so that the periods over which profits were measured were in general shorter than the wage period ($\frac{1}{2}$ to $\frac{2}{3}$ the length of the latter). See appendix I, table A-I.

TABLE 2
Regression Results for Industries in the Key Group¹

Industry	Industry Variables				Group Variables			
	Constant	Profits	Unemploy- ment	R ²	Constant	Profits	Unemploy- ment	R ²
Rubber	-0.70	.37 (.13)	-.31 (.26)	.89	3.25	.32* (.06)	-.90** (.09)	.99**
Stone clay and glass	-84.47	2.12* (.69)	9.57 (4.84)	.94	-5.57	.72** (.07)	-.57* (.10)	.99**
Primary metals	4.09	.44* (.12)	-1.57* (.28)	.98*	-5.94	.61 (.35)	-.79 (.52)	.90
Iron and steel	-4.72	.91* (.27)	-1.57* (.37)	.96*	-11.76	1.18* (.75)	-.94 (.36)	.97*
Refabricated metals	4.89	.26 (.15)	-.92 (.46)	.96*	-4.16	.62** (.05)	-.46* (.08)	.995**
Nonelectrical machinery	-19.03	1.49 (.87)	-.13 (.73)	.62	-7.76	.84* (.19)	-.51 (.27)	.96*
Electrical machinery	-13.68	.94 (.35)	.16 (.53)	.87	-9.25	.95* (.20)	-.73 (.29)	.97*
Transportation equipment	-5.54	.61* (.10)	-.51* (.10)	.97*	-5.56	.66** (.09)	-.39 (.14)	.98*
Autos	6.98	.20 (.79)	-.78 (1.25)	.34	-11.85	1.02** (.04)	-.50** (.06)	.999**
Instruments	-0.57	.36 (.25)	-.03 (.31)	.62	-2.01	.42 (.24)	-.05 (.36)	.72

1. Throughout this study, the significance of R² was determined by the standard F-ratio test. The significance of the regression coefficients was determined by one-tailed t-tests.

* Indicates statistical significance at the .95 level.

** Indicates statistical significance at the .99 level.

unemployment again prove to be significant variables. Key group variables give a better explanation than individual industry variables and the regression coefficients for the group variables are similar.

Other Variables. Several tests indicated that productivity and consumer prices do not appear to be important independent variables in wage determination, although consumer prices play a major role in periods of extreme change (1950-51) and have a minor influence through escalator clauses.

Cross Section Analysis. Two sets of cross-section data were run. The first is a moving cross section, in which all the time-series data are pooled, and in which a set of dummy variables is introduced to measure the effects of time, and another set is used to measure the effects of industries. Table 2 summarizes this analysis. Profits are the only significant variable in this analysis.

Cross-section analyses for each wage round were also run for profits, profits and a dummy variable indicating the degree of unionization, profits and another dummy for industrial concentration, and all three combined.

These cross-section analyses yielded rather limited results because most of the variation in wages is associated with changes over time, not with the difference among industries, and because of the presence of spillovers. The time series for the key group yields a coefficient of .73 for profits, versus .21 in the pooled cross section with time dummies. The time-series coefficients are better estimates of long-run parameters because: (1) in the presence of spillovers,

TABLE 2

Regression Analysis of Pooled Cross-Section -- Two-Digit Industries,
Five Wage Rounds

Constant	Profits	Unemployment	Time ¹ dummies	Industry dummies	Corrected ² R ²
-.58	+.46** (.05)				.50**
.28	+.43** (.05)	-.12 (.09)			.51**
1.41	+.21** (.05)	+.002 (.07)	-.81 +3.88** +.63 +.74		.74**
1.65	+.22** (.08)	+.05 (.09)	-.84* +3.89** +.72 +.75	3 4	.74**
-.91	+.58** (.06)	-.19* (.10)		5	.56**

1. Values for the periods 1-4; the dummy for period 5 is the constant.

2. Corrected for degrees of freedom so that the successive R^2 can be compared.

3. Eighteen industry dummies, one for each industry, were used. None was statistically significant.

4. Concentration and unionization dummies were also tested in place of the industry dummies. The coefficients (and their significance) for profits, unemployment and the time dummies were little affected. Concentration dummies were not significant, but unionization was significant at the .95 level.

5. When the industry dummies were introduced without the time dummies, one of the eighteen coefficients was significant at the .95 level, which one would expect by chance.

* Indicates statistical significance at the .95 level.

** Indicates statistical significance at the .99 level.

the cross-section data are biased toward zero because of the pull toward uniformity. Corrected for the bias, both coefficients are consistent; (2) since most of the bargaining periods contain both prosperity and recession, some of the short-run cyclical effects are averaged out.

Wage Determination Outside the Key Group. The profit-unemployment explanation of wage changes was also attempted for industries outside the key group. Regressions using industry variables are significant at the 95 per cent level for only three of the 11 industries. The degree of spillover from the key industries is indicated by regressing key wages and industry unemployment in each outside industry, which provides statistically significant explanations for eight of the 11 industries, with four at the .99 level, and similarly for industry profits.

Relation to Previous Empirical Results. This study was indebted to the work of Levinson in emphasizing the importance of wage rounds and key bargains, and in discovering the central significance of profits in his analysis of annual manufacturing data. Bowen avoided the difficulties of annual data by using cyclical periods but obtained some puzzling results, perhaps because his periods do not correspond to bargaining periods, and because of the weakness of the cross-section approach. He found a significant profit-wage relationship in all periods, but in only two was labor market demand significant; however, he used employment change as the labor market variable. Phillips used the change in unemployment as an additional explanatory variable; to test this, key group wage changes were regressed against unemployment

and its change: unemployment was significant at the 95 per cent level, but its change just missed significance. Lipsey found a nonlinear relationship between unemployment and wages for English data; the extent of nonlinearity in the American data appears to be smaller, probably due to conceptual differences in the data. Lipsey and Steuer found no evidence in 1949-58 in the U.K. for the profit-wage hypothesis advanced by Kaldor, using ten industry time series; it would be interesting to test the profit-unemployment hypothesis for British data, using institutional assumptions appropriate to the British case.

Is There a Phillips Curve for the U.S.? Since profits and unemployment are both important variables, and are not highly inter-correlated, one cannot expect a curve plotting wage changes against only one of the explanatory variables to fit well. Further, the wage-round mechanism is missed by the plotting of annual data. The findings here imply that there is no one critical level of unemployment which is consistent with "noninflationary" wage increases. If profits are high, a much higher level of unemployment is necessary than if profits are low.

Summary. Incorporating into the analysis important institutional characteristics of the wage determination process -- collective bargaining in wage rounds, the existence of a key group of related heavy industries -- standard economic variables account for the bulk of the wage changes in manufacturing from 1948-60. Wages in the key group are explained by profit rates and unemployment rates in the group. In some other industries, wages are largely determined by spillover effects of key group wages and economic variables applicable to the industry.

Going back to the issues posed at the start, there is only weak evidence that unionization affects the long-run level of wages. But the economic variables enter into wage determination differently than under pure demand and supply mechanisms. Both product and labor market conditions influence the outcome of bargaining on wages, and both economic and political factors play a role. Political factors enter our theory through the recognition of the key group and the wage round; they also help determine the lag structure and the parameters of the economic equations.

Harold M. Levinson, Postwar Movement of Prices and Wages in Manufacturing Industries, Joint Economic Committee Study of Employment, Growth and Price Levels, Study Paper No. 21, January 30, 1960.

As part of an evaluation of the forces underlying postwar inflation in the United States, a number of statistical analyses were carried out relating percentage changes in straight time hourly earnings in 19 manufacturing industries with movements of several other variables for 1947-58.

Wages and Related Factors. Table 1 suggests that there was a strong relationship between hourly earnings, profits and concentration ratios,¹ particularly after 1951.

Partial correlations were computed for earnings and profits after correcting for the effects of output changes, and the relationship held, although it was somewhat weaker. Multiple regressions for the subperiods 1947-53 and 1953-58 were also consistent with the previous findings: no significant partial coefficients for the early period; profits highly significant in the second subperiod, with both employment and output of virtually no significance (Table 2). Analysis of year-to-year changes by industry revealed, again, consistently stronger correlations for earnings and profits, particularly profits after taxes lagged by one year,

1. Concentration ratios, the proportion of output produced by the four leading firms in an industry, are only a rough index of the degree of monopoly because (a) no account is taken of competition from substitute products or imports, and (b) on the other hand, ratios for the entire country will understate the degree of monopoly where the market (e.g., for goods with high transportation costs) is local or regional.

TABLE 1

Simple Cross Section Correlation Coefficients Between Wage Changes and Selected Variables in 19 Manufacturing Industries, 1947-58¹

Year	Straight time earnings on —					Concentration ratios on —	
	Production worker employment	Output per production worker manhour	Profits before taxes	Profits after taxes	Output on profits before taxes	Profits before taxes	Profits after taxes
1947-48	0.417	-0.248	0.195	0.012	0.138	0.463	0.071
1948-49	-0.050	.162	.024	.616	.777	.237	.527
1949-50	-0.563	.362	-0.372	-0.087	-0.097	.654	.340
1950-51	.171	-0.247	.078	.178	.127	.631	.371
1951-52	.087	.118	.039	.598	.707	.491	.463
1952-53	.249	.251	.332	.550	.689	.724	.537
1953-54	.203	-0.279	-0.067	.628	.520	-0.059	.598
1954-55	.233	.102	.383	.514	.600	.500	.460
1955-56	-0.197	.354	.086	.055	.146	.259	.603
1956-57	.230	.390	.372	.546	.544	.726	.755
1957-58	-0.576	.049	-0.140	.392	.484	.222	.698

1. The 5 per cent level of significance is 0.4555. The one per cent level is 0.5751.

than for output or employment (Table 3). The lagged profit relationship with wages continued strong in a test for partial effects of profits and employment (Table 4).

Union strength could be tested only by the use of 1947 data, in the form of range estimates. When industries were ranked by earnings increases in each of the two subperiods, both union and nonunion industries were found in the highest and lowest groups (Table 5). The absence of any differential effect does not, of course, prove that unions had no effect on wages.

Wage Patterns. Table 6 summarizes collective bargaining settlements in several manufacturing industries (or companies generally representative of entire industries), by high and low concentration, and for three subperiods. Two points stand out: (a) The general level of settlements was very similar for the great majority of industries in 1946-50, but thereafter, settlements in the competitive sector were far below the pattern in the concentrated sector; (b) automatic wage changes, incorporated into long-term agreements in the form of cost-of-living adjustments and annual improvement factors, became increasingly popular after 1951. In 1955 and 1956, almost every unionized company in the concentrated sector signed a contract providing for such automatic changes, following the key bargains in the automobile and steel industries; with output and profits high, these were extremely favorable to the workers. The significant point is that their effects continued to be felt through the declining years of 1957 and 1958.

Price Movements. A similar analysis was carried out for price

movements. Perhaps of greatest interest in Table 9 is the lack of any relationship between changes in prices and output up to 1954; in 1954-55, a year of sharp recovery, it was strong, and thereafter rather weak. The most consistent correlation throughout the period was between price changes and profit levels. Price changes and productivity changes were weakly (and negatively) correlated in six of the 11 years. A correlation between price changes and concentration ratios appeared in several of the years after 1951 but was below the five per cent significance level in all but three. In four of the years after 1952, prices and earnings were significantly correlated at the five per cent level.

A comparison of overall trends in manufacturing with those in industries grouped by degree of unionization and concentration (Table 14) is suggestive, although more detailed studies would be required for a firm evaluation. Most striking are the trends in the primary metals industry, one of the highly concentrated and highly unionized industries: the wholesale price index here rose about one third higher than the price index for all manufacturing, direct labor costs per unit rose nearly 20 per cent more and returns to capital 13 per cent more than in all manufacturing. Yet output rose considerably less than in manufacturing as a whole.

Summary. 1. No important relationship was found between percentage changes in earnings and output, production worker employment or productivity. On the other hand, a strong relationship was indicated, particularly after 1951, between earnings, profits and concentration ratios. These general relationships were supported by both simple and multiple cross section and time series analyses, and by an analysis of

wage "patterns."

2. No generally applicable relationship appeared between estimates of union strength and wage increases.

3. One of the factors underlying the upward movement of hourly earnings during the 1956-58 period was the long-term contracts originating in the automobile and steel settlements of 1955 and 1956, and followed by several other major industries.

4. No important relationships were found between changes in price and output, or between price and productivity per production worker manhour.

5. Changes in price were most clearly related to profit levels throughout most of the postwar period. A strong relationship to earnings also developed after 1951. No consistently strong relationship appeared with concentration ratios.

William G. Bowen, "Inter-Industry Variations in the Unemployment-Wage Relationship," Wage Behavior in the Postwar Period, 1960.

The analysis of interindustry wage behavior permits direct examination of two influences not readily discernible in general wage movements: industrial concentration and unionization. To analyze the relationship between wage movements and these variables, plus two others -- profitability and employment trends -- simple, partial and multiple correlation techniques were used.

Simple correlation coefficients for 19 two-digit manufacturing industries indicate that the four explanatory variables do seem to affect the inter-industry pattern of wage behavior in the direction suggested by a priori speculation. In six sub-periods¹ of 1947-59, wages in the main rose most rapidly in industries characterized by relatively large increases in employment, relatively large profits,² high degrees of concentration,³ and unionization.⁴

Simple Correlation Coefficients Between Inter-Industry Wage Behavior and Selected Variables, Within Sub-Periods of 1947-59*

Simple Correlations Between Wage Changes and --				
Sub-Periods	Percentage Changes in Employment	Average Profit Levels	Concentration Ratios	Unionization Ratios
Jan. 47-Jan. 49	.48	.21	-.06	.02
(R) Jan. 49-Oct. 50	.19	.36	-.14	-.36
Oct. 50-Dec. 53	.44	.64	.54	.74
(R) Dec. 53-June 55	-.04	.49	.69	.41
June 55-Aug. 57	.22	.18	-.17	.41
(R) Aug. 57-June 59	-.49	.60	.72	.22

Notes: *The 10 per cent level of significance is .39; the 5 per cent level of significance is .46; and the 1 per cent level of significance is .58. (R) indicates the three recession sub-periods.

Multiple correlation coefficients, for all four explanatory variables taken together, for the six periods were .84, .55, .82, .72, .94 and .73, all significant at the 5 per cent level except for the second. In the three low

unemployment periods, the coefficients were significant at the 1 per cent level.

Of the four variables, profits had the most consistent relationship with wages, although in each period one of the other variables had a higher correlation coefficient.

Partial correlation coefficients were in general lower, and only eight were significant at the 5 per cent level. The strength of the profit-wage relationship was drastically reduced in the last three periods, and unionization showed some negative correlations. On the other hand, the employment-wage relationship was markedly higher in the low-unemployment periods of 1947-48 and 1955-57 than in the first table, but disappeared in 1950-53 (possibly because all four variables were also highly correlated in that period).

Partial Correlation Coefficients Between Inter-Industry Wage Behavior and Selected Variables, Within Sub-Periods of 1947-59*

Sub-Periods	Percentage Changes in Employment	Partial Correlations Between Wage Changes and --		
		Average Profit Levels	Concentration Ratios	Unionization Ratios
Jan. 47-Jan. 49	.82	.68	.68	-.23
(R) Jan. 49-Oct. 50	.06	.38	-.18	-.40
Oct. 50-Dec. 53	-.03	.38	.25	.56
(R) Dec. 53-June 55	-.23	.00	.56	.18
June 55-Aug. 57	.90	.09	-.84	.62
(R) Aug. 57-June 59	.08	.01	.41	-.19

Notes:

*These are third-order partial correlation coefficients; that is, each partial correlation coefficient reports the relationship between wages and the particular explanatory variable under study when all three other explanatory variables are held constant.

The 10 per cent level of significance is .43; the 5 per cent level of significance is .50; and the 1 per cent level of significance is .62.

(R) indicates the three recession sub-periods.

The difference in the profit-wage relationship between the earlier and more recent sub-periods may be due to the fact that the low-concentration, low-unionization industries were the high profit earners in 1947-48 and to a lesser extent up to the Korean war period. Later, the highest profits and the largest wage increases occurred in the high-concentration, high-unionization industries, so that profits did not appear to be an independent influence on wages. The high negative coefficient for concentration and wages in 1955-57 is impossible to explain.

Unionization appeared to have little significant relationship with wage changes. It should be noted that these are interindustry analyses and that gains won by unions might have spread to nonunion industries, thus raising the general wage level.

Concentration and Unionization. Since a high degree of concentration and unionization occur together in many industries, their combined effect was examined.

The difference in wage behavior between the competitive and market-power sectors stands out sharply. Profits were also higher in the concentrated sector while employment trends were fairly similar in both sectors.

The different effects of economic adversity on the two sectors is evident if the three recession sub-periods are examined. In the competitive sector, the magnitude of wage increases varied directly with profits and employment. In the market-power sectors, there was a striking inverse relationship between the magnitude of wage increases in the three recessions and the corresponding profit levels and employment trends.

An "incidence-of-recessions" hypothesis is suggested by these data: Wages in general are likely to rise faster when the brunt of a recession falls

A Comparison of Five High-Concentration--High-Unionization
Industries with Five
Low-Concentration--Low-Unionization Industries

		(R)	(R)	(R)		
	Jan.47-Jan.49	Oct.50-Dec.53	June55-Aug.57			
	Jan.49	Oct.50	Dec.53	June55	Aug.57	June59
<hr/>						
Average Percentage Change in Wages in the:						
Market-Power Sector*	9.7	3.6	6.5	3.8	5.3	4.5
Competitive Sector*	7.4	4.4	3.9	1.1	4.6	2.2
<hr/>						
Average Percentage Change in Employment in the:						
Market-Power Sector	-3.1	5.6	1.9	0.1	-0.7	-1.3
Competitive Sector	-2.0	5.2	-3.7	1.2	-2.0	1.2
<hr/>						
Average Level of Profits in the:						
Market-Power Sector	11.7	13.4	12.8	12.2	14.1	10.7
Competitive Sector	17.1	10.4	7.7	4.9	7.8	6.2

Notes:

*The "market-power" sector contains the following five high-concentration -- high-unionization industries: Transportation Equipment, Rubber, Primary Metals, Electrical Machinery, and Stone, Clay, Glass. The "competitive" sector contains the following five low-concentration -- low-unionization industries: Leather, Textiles, Furniture, Apparel, and Lumber.

(R) indicates the three recession sub-periods.

on market-power industries than when it falls on the competitive sector. Wage policies of firms and unions in industries where the product market is not highly competitive may not be very much affected by a decline in business. Long-term contracts with automatic wage adjustments tend to occur much more frequently in the market-power sector. The substantial wage increases in the 1958 recession, which had the greatest impact on the market-power sector, can be explained on this basis.

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1. The sub-periods were divided into three recession periods, in which unemployment was above 4.3 per cent each month, and three in which unemployment was generally below 4.3 per cent. 4.3 per cent was a convenient cut-off point because it just excluded the period from May 1955 to August 1957, when unemployment was roughly stable at around 4.2 per cent, from the recession category. All six of the sub-periods contain roughly the same number of months in which unemployment was increasing and decreasing, so that the direction of change was held approximately constant.
 2. Averages of quarterly data on average rate of return on stockholders, equity, for each sub-period.
 3. Concentration was measured by the proportion of total industry output supplied by the four largest firms. It is a rough index of the degree of competition in the product market, although of course it overlooks competition from substitute products.
 4. Unionization ratios measure the per cent of workers in each industry who in 1958 worked in establishments in which a majority of workers were covered by collective bargaining agreements (Monthly Labor Review, April 1960).

John T. Dunlop, "Productivity and the Wage Structure," Income, Employment and Wage Policy, 1948.

Interest in the long-run relationship between productivity and the level of prices and wages has tended to obscure another interesting relationship: the impact of productivity changes on the structure of wages and prices. Wage rates could not be adjusted uniquely to increases in productivity in particular firms, occupations or industries and preserve a balanced wage structure. The total adjustment normally takes the form of a combination of an increase in wages, a price adjustment and, in the short run, an increase in profits. The concern of this study is the longer run -- rather than the cyclical -- adaptation of wage rates to uneven rates of change of productivity among different industries.

Interindustry Wage Changes. Rather than the extreme cases of (a) wages adjusting completely to interindustry differences in productivity or (b) a completely inflexible interindustry wage structure, with relative prices alone reflecting differential productivity changes, a more realistic model (c) depicts industries with more than average increases in productivity raising wages somewhat more than the average. Generally the most rapid gains in productivity are to be expected in the stages in the life history of an industry when output is expanding rapidly: hence greater than average wage increases occur not only because industries are able to pay higher wages but because higher wages will be necessary to attract an expanding work force to the industry. The normal inertia of workers must be overcome -- their reluctance to forfeit seniority rights and other factors -- and a firm or industry seeking to expand employment rapidly must expect to pay a premium rate. Less than average wage increases in the contracting industries tend similarly to facilitate movement out of employment

in those fields.

Prices serve the same function: above average increases tend to accelerate the relative or absolute contraction of employment in industries where productivity is increasing less rapidly than the average, and the converse also holds. In industries with above-average productivity increases, the failure of prices to fall as far as they might, tends to restrict the expansion of employment it could otherwise afford. These relatively adverse effects on employment constitute the short-run effects of the movement toward the longer-run equilibrium position in which the average wage level is adjusted to an increase in average productivity.

Statistical Evidence. There is considerable evidence that productivity increased most in the industries in which, and in the period when, employment and output expanded most. Fabricant's study¹ depicts an economy with a group of "younger" industries expanding rapidly in employment, output and productivity. In a group of "older" industries, employment and output increase very slowly or actually decline; productivity increases very slowly and labor costs and prices increase absolutely, or at least relative to the first group. The life history of the individual industry consists in a gradual movement from the first to the second group. At any one time, industries are distributed throughout the range of the employment-output-productivity pattern.

How are wage rate movements among industries related to the pattern of change? Do wage rates increase the most where and when productivity increases most rapidly? The intermediate case suggested above requires some positive correlation between increases in wage rates and productivity.

1. Solomon Fabricant, Employment in Manufacturing 1899-1939, National Bureau of Economic Research, 1942.

Professor A. H. Hansen believes that the economy should and does work this way. But Fabricant found virtually no rank correlation ($-.05$) between changes in unit labor requirements and wages per workers. Wages per worker are affected by varying rates of change in the length of the working day; the correlation was slightly higher ($.22$) when the same data were used to compare productivity and wages per hour by industry.

More reliable data for a shorter period show a much higher rank correlation between productivity increases and wages. Bureau of Labor Statistics data for 33 manufacturing industries in 1923-40 yielded the rank correlation of $.47$ for increases in output per manhour and increases in average hourly earnings. When the series was weighted by relative amounts of employment, the rank correlation rose to $.60$. The removal of two relatively insignificant industries (ice cream and chewing tobacco) raised the computed rank correlation to $.65$ and, when weighted by employment, to $.72$.

These figures suggest a significant relationship. But the pattern is not unique and the correlation is not high because adjustment also takes the form of price changes; one would expect a higher correlation between changes in productivity and prices. Furthermore other factors are important in wage determination: patterns set by a union or an employer operating in several industries; local labor market patterns; the bargaining power of unions; methods of wage payments (piecework and incentive rates make possible the earlier capture of productivity gains); and the particular character of competition in product markets. In a highly competitive industry, productivity gains may all go into price adjustments.

Wage Leadership. No model of adjustment in the wage structure can neglect the facts of wage leadership in an economy with collective bargaining. If

leadership in setting the pattern is held by unions and firms in the expanding sector, where increases in productivity are high, the rounds of wage increases will no doubt be larger than if the pace is set in contracting industries.

Wage leadership may be located in particular industries by virtue of the "political" position of union leaders within the labor movement, by the accidents of mavericks and extraordinarily profitable firms, and by the chance timing of contract expirations. If this leadership happens to coincide with industries in which productivity has been increasing rapidly, the wage level may be expected to rise more than in other circumstances.

The Dynamics of Interindustry Wage Structure. The generalization represented by case (c) is a useful starting point for a theory of the dynamics of inter-industry wage changes, as Table 7 indicates. An array of the percentage changes in average hourly earnings from 1923-40 for 33 manufacturing industries (plus coal and railroads), it shows clearly that the highest earnings increases occurred in industries with productivity and output increases above the average (with the minor exception of chewing tobacco), and the lowest increases were generally associated with industries with productivity and output increases below the average. Table 7 also indicates that wage differentials are not relatively constant over time. The range of variation, from a decrease of 3.7 per cent in boots and shoes to an increase of 64 per cent in chemicals, constitutes a surprising amount of pliability in the interindustry wage structure. The dispersion in Table 7 also suggests that a theory of the interindustry wage structure must include other factors beside changes in productivity and output or employment. In addition, three other economic factors probably set the main outlines and tendencies for interindustry wage relationship: the proportion of labor costs to total costs; competitive conditions in product markets; and the

TABLE 7

Percentage Increase in Average Hourly Earnings 1923-40

Industry	Percentage Increase in Average Hourly Earnings
Chewing & smoking tobacco and snuff	69.2
Chemicals	64.1
Rayon	56.4
Petroleum refining	53.4
Iron and steel	45.5
Rubber tires	44.6
Glass	42.7
Cigarettes	40.0
Paints and varnishes	37.2
Motor vehicles	36.5
Pulp	35.8
Agricultural implements	33.5
Cane sugar refining	32.6
Knit goods	29.5
Canning and preserving	28.6
Slaughtering and meat packing	26.8
Leather	25.8
Cement	25.7
Newspaper & periodical printing & publishing	25.3
Steam railroads (class I)	22.4
Paper	22.2
Woolen and worsted goods	22.0
Fertilizers	20.9
Bread, bakery products	19.6
Cigars	17.0
Flour, grain mill products	15.8
Primary smelters, refineries	14.5
Cotton goods (cotton-growing states)	13.0
Lumber and timber products	10.7
Clay products, nonclay refractories	6.1
Bituminous coal	4.5
Cotton goods (New England)	3.3
Furniture	3.1
Ice cream	-1.4
Book and shoes	-3.7

skill composition of the industry's work force.

This theoretical framework appears to give no distinctive place to unions. The discussion of wage leadership indicated that labor organizations can have a decisive influence on wage levels. The five factors listed above establish the main outlines, constitute the important realities with which parties to collective bargaining must grapple. They tend to set practicable limits to bargains; but they are not the complete story. When all the factors influential at the bargaining table are taken into account, the final wage bargain may diverge, even over long periods, from that indicated by the framework above. While opinions may differ, the author is of the opinion that in most cases the divergences will not be very large.

Joseph W. Garbarino, "A Theory of Interindustry Wage Structure Variation," Quarterly Journal of Economics, May, 1950.

The positions of Dunlop ("Productivity and the Wage Structure") and Ross (Trade Union Wage Policy, 1948) will be examined with a view to proposing a broader model. Dunlop concluded that productivity explained the major portion of the observed variation in the interindustry wage structure and Ross stressed the influence of union organization.

Productivity and Employment. Dunlop mentioned two channels through which changes in productivity affect average hourly earnings: piece work systems of payment, and the fact that industries in which productivity is rising are also expanding industries which must offer higher wages to attract additional workers. To support the second point, Fabricant's Employment in Manufacturing, 1899-1939 is cited. But Fabricant's data do not show a consistent relationship between employment and the reciprocal of output per manhour; the rank correlation coefficient was only $-.31$ for the whole period. Bureau of Labor Statistics data for 1919-40 yield a correlation coefficient of only $.08$ for productivity and employment.

Dunlop found a fairly definite relationship between changes in productivity and changes in earnings: a rank correlation of $.47$ for 33 industries, $.65$ for 31 industries. But the suggested link between productivity and employment changes is not supported by the evidence.

Unionism. Ross's methodology was open to criticism. The relationship between unionism and earnings was illustrated by the calculation of an average, weighted by employment, of the percentage increases in earnings for each unionization group (each group representing different

degrees of organization). Unweighted averages would be more appropriate and would in fact give much less decisive results. Simple comparison of group averages obscured the fact that dispersion was greater within classes than among the group averages.

The Model. A more complete system will be attempted here. Wage movements are regarded as dependent on developments internal and external to the firm. The internal development -- a decline in unit costs resulting from increased output per manhour -- provides an advantage, and the character of the markets external to the firm (product and labor markets) determines the division of the gains. The wage-influencing variables, their precise formulation determined by the availability of data, are therefore: differential changes in output per manhour, degree of concentration of production (National Resources Committee estimates for 1935) and the extent of coverage of collective bargaining agreements (BLS data for 1941 in the form of four broad ranges). It should be noted that the three variables are not entirely independent of each other.

Statistical Evidence. BLS indexes of average hourly earnings and output per manhour are available for 34 industry groups for 1923-40. Wage movements are measured in percentage terms, a process criticized by Ross; but his contention that a bias is built into such data seems to depend on a narrowing of percentage differentials over time. Indications are that differentials widened slightly between 1923 and 1940: according to National Industrial Conference Board data for 25 industries, the ratio between the highest and the lowest industries (in terms of absolute earnings) rose from 181 per cent to 191 per cent.

The rank correlation coefficient for the relationship between changes in earnings and changes in output per manhour is .60. With the elimination of the silk and rayon industry, in which output per manhour increased completely out of proportion to the increase in earnings, the coefficient rises to .71. This degree of relationship supports the hypothesis that productivity increases are a possible source of wage advantage.

The rank correlation coefficient for the relationship between the degree of concentration and changes in earnings is .67.

The relationship between unionism and earnings could not be tested by correlation because of the range estimates. Dividing the industries into the four unionization groups, it is apparent that as with Ross's data, the variation within groups is more pronounced than the variation among the group averages. The very loose relationship might be the result of the fact that unionization entered the picture so late in the time period.

Significance. There was a significant relationship between concentration and unionization ("z" test). In the larger study from which this article was drawn, the "z" test was applied to the earnings-concentration relationship and the productivity-earnings relationship and in both cases the results seemed unlikely to be due to chance.

Both output per manhour and concentration seem to be better "explanations" of the wage behavior of this period than the degree of organization.

Multiple Correlation. If the simple rank correlations of .60 and .67 for productivity and concentration with earnings, respectively, are

used to arrive at a multiple correlation coefficient, a value of .856 results. (The rank coefficient between productivity and concentration was .28.)

When the industries in which productivity and earnings are not highly correlated are examined, the other variables may explain the nonconformists. In eight industries where the increase in earnings was considerably lower than the increase in output per man-hour (a difference in excess of three in rank), both concentration and unionization were low. In 11 industries which had a rank in earnings considerably greater than the rank in productivity increases, unionization was high in four, concentration was high in one, and increases in employment were very substantial (over 25 per cent) in four.

Conclusion. The variables of productivity, concentration, and unionization are capable of explaining the major portion of differential movements in earnings. Consideration of changes in employment adds to the usefulness of the model in some cases where changes in employment were substantial.

Arthur M. Ross and William Goldner, "Forces Affecting the Interindustry Wage Structure," Quarterly Journal of Economics, May, 1950.

The data used here are average straight-time hourly earnings, employment, and degree of unionization¹ for 1933, 1938, 1942, and 1946 in 47 manufacturing and seven nonmanufacturing industries (Table 1). The basis for inclusion was simply the availability of reasonably accurate, complete, and comparable data.

Percentage and Absolute Increases. Comparisons of relative wage movements are almost universally made in terms of percentage increases. In percentage terms, differentials were compressed continuously throughout 1933-46. Compression was more prominent in 1933-38 than in later intervals, contradicting the common notion that the interindustry wage structure tightens up most vigorously in periods of full employment and inflation.

However, in absolute terms, movements were fairly uniform among industries. The average increase for 50 industries from 1933-46 was 60 cents an hour: 35 industries showed deviations of less than 10 cents; and nine, from 10-15 cents. In those years, influences affecting the economy as a whole were stronger than those affecting individual industries differentially.

Since percentage comparisons are heavily influenced by the original level of earnings, absolute increases in earnings will be used.

Degree of Organization. New unionism appears to have been a source

1. Measured in percentage of workers in the industry covered by union agreement, with four categories: less than 40 per cent, 40-60 per cent, 60-80 per cent and 80-100 per cent.

of relative wage advantage in 1933-46, but continuing unionism was not. Table IV shows that the six industries organized at least 40 per cent in 1933 lagged behind all other groups, including the industries which were still unorganized in 1946, in absolute increases in hourly earnings. Among the remaining industries, those which were more highly organized in each terminal year (1938, 1942, 1946), appeared to have made higher gains after 1933 than the industries remaining substantially unorganized.

Employment Changes. Employment changes have been associated with differences in the movement of earnings. For 1933-46, the lowest fourth of industries with respect to changes in employment (the change was a decline in employment in most of these industries) had an average increase of 55.1 cents in hourly earnings; the second quarter, 57.5 cents; the third, 59.1; and the highest, 64.0 cents (Table 6).

Were the industries which sustained the greatest growth in employment also the industries with the new unions? On the average, they were, although there were many exceptions. Furthermore, the apparent trend in the average is largely the result of two industries which had very large increases in employment during the war and also became unionized: aircraft and shipbuilding. Hence it is difficult to make a definitive statement on the independent influences of unionization and the growth of employment on wages.

Other Influences. It would have been desirable to examine the relationship between productivity and wage movements, but the statistics are too spotty.

The proportion of labor costs to total costs is often mentioned as a significant factor in interindustry wage differentials. Table IX,

showing labor cost as a percentage of product value in 1939 and increases in straight-time hourly earnings from 1933-46, for 48 industries, indicates that the labor cost proportions, which are fairly stable from year to year, do not seem to be associated in any way with absolute increases in earnings. Nor are they associated with percentage increases or with absolute levels of earnings.

Professor Dunlop suggested that "the more competitive the product markets for the output of industry, the more difficult for wage earners to capture the gains of increased productivity." ("Productivity and the Wage Structure.") This proposition cannot be tested precisely. But the 11 industries showing the largest wage increases in 1933-46 (66 cents or more) were heavy industries, with an oligopolistic market structure. However, 10 of these became unionized between 1933 and 1946; and eight out of 11 are also in the upper two quarters in terms of employment growth.

The 12 industries showing the smallest wage increases (less than 55 cents) were mainly light industries, with a concentration in food and textiles; product competition was clearly greater here. However, the industries in this group which were not organized in 1933 remained largely unorganized (under 60 per cent), and were also in the two lower quarters for employment growth.

Conclusions.

1. Interindustry wage movements have been more uniform than is generally realized, in terms of absolute increases. The strongest influences seem to have operated throughout the economy rather than affecting industries differentially.

2. Among the industries which were substantially unorganized in 1933, subsequent increases in earnings were associated with changes in the degree of organization. However, those which were already organized in 1933 lagged behind all other groups.

3. In general, earnings increased more rapidly in those industries showing the larger gains in employment.

4. Increases were larger in heavy industries with an oligopolistic market structure.

5. These three influences were operative in substantially the same group of industries. Their separate effects cannot be distinguished. Our own belief is that unionization is a source of wage advantage, which operates most effectively under facilitating environmental circumstances. In conditions which have recently prevailed in the United States, unionization has thus been a necessary but not a sufficient condition for larger-than-average increases in earnings.

Frederic Myers and Roger L. Bowlby, "The Interindustry Wage Structure and Productivity," Industrial and Labor Relations Review, October 1953.

The emphasis of Dunlop and Garbarino on the relationship between productivity and changes in the interindustry wage structure is tested statistically here by an examination of data more recent than those for 1923-40 which they used. Of the 35 industries for which data on average hourly earnings and physical output per manhour were available for 1923-40, 16 industries could be carried forward to 1947 (for a 17th industry, the data covered 1925-47), and 11 could be carried forward to 1950.

The sample was small. The 17 industries had an aggregate employment of only 2.8 million in August 1941. Because percentage changes rather than absolute changes had to be used for the output data, where the units were not homogeneous, they had to be applied to earnings as well, although cents per hour would have been preferable. Both Dunlop and Garbarino omitted industries which they considered abnormal, but no omissions are made here; if the abnormalities occurred frequently enough to affect the results substantially, then they should not be disregarded.

Statistical Evidence. The rank correlation coefficient between changes in output per manhour and changes in hourly earnings for the 16 industries for which data were available for the entire period 1923-47 was only .17.

It was then hypothesized that the tremendous institutional changes beginning in 1933 might have altered a pre-existing relationship, and correlation coefficients were computed for the large sample of 35 industries for 1923-33, as well as for the smaller 16-industry sample. The results

were coefficients of .40 and .29 respectively, indicating the possibility of a stronger relationship in the earlier period than over the entire period. Computations for the two samples with different breaking points in the post-1933 years gave no hint of a positive relationship. The relatively high negative coefficient for 1947-50 is based on data for only 11 industries and is probably fortuitous.

The period 1923-33 was then more intensively investigated, with the interesting results that, for both samples, coefficients of rank correlation for the prosperity period 1923-29 and the depression period 1929-33 were higher than for the entire span. Thus the significant relationship seemed to have been a part a cyclical as well as a secular one.

Rank Correlation Coefficients:
Changes in Output per Manhour
Related to Changes in Hourly Earnings

	35 Industries	17 Industries
1923-47	n.a.	.17*
Before 1933		
1923-33	.40	.29*
1923-29	.57	.55*
1929-33	.45	.64
After 1933		
1933-47		.08*
1933-40	-.02	.09
1933-37	.18	-.20
1937-41	n.a.	.04
1941-47	n.a.	-.06
1947-50	n.a.	-.34**

* 16 industries

**11 industries

Conclusions. The hypothesis of Dunlop and Garbarino was not found to be capable of extension to a time period later than the one which they studied, as the latter thought likely. It also appeared that whatever relationship existed was stronger intracyclically from 1923-29 and 1929-33 than over the entire period 1923-40. After 1933, changes in inter-industry wage relationships seemed unrelated to relative changes in output per manhour.

Dunlop maintained that the productivity variable was not cyclically important; he explained differential wage reductions in depression in terms of differential pressure on prices (Wage Determination Under Trade Unions, Ch. 7). But why could not differential changes in productivity in depression provide an alternative outlet for the pecuniary pressures generated by prices, since in a recovery, they would permit differential wage increases? The evidence for the period before 1933 indicates that some such process occurred. Over longer periods the association between wage and productivity changes was obscured. The change in the institutional setting after 1933 -- the growth of unionism, government intervention in wage setting -- clearly introduced determinants of interindustry wage changes other than changes in productivity.

Richard Perlman, "Value Productivity and the Interindustry Wage Structure," Industrial and Labor Relations Review, October, 1956.

The correlation between physical productivity and relative wage movements among industries has been of interest because of its significance as an index of the strength of economic factors in wage determination. However, this comparison is in fact a poor measure of the impact of economic forces.

Wage-Physical Productivity Comparisons. Statistical studies have had confusing results. Dunlop's 33 manufacturing industries, plus coal and railroads, for 1923-40 yielded a rank correlation of .49 for average hourly earnings and output per manhour. Garberino computed a rank correlation of .60 for 34 manufacturing industries for 1923-40. Myers and Bowlby, in an analysis of 16 industries for the period 1923-47, found a rank correlation of only .17. They stressed the difference between the longer run and short run, suggesting the cyclical periods (1923-29 and 1929-33) showed higher correlations than the entire period 1923-47.

The erratic nature of the correlations reflected the importance of the terminal year of the comparison, as the following table indicates:

Rank Correlation Between Percentage Changes in
Average Hourly Earnings and Output per Manhour
for 16 Industries, 1923 to 1940-47

<u>Years Compared</u>	<u>Rank Correlation</u>
1923 : 1940	.29
1923 : 1941	.26
1923 : 1942	.10
1923 : 1943	.02
1923 : 1944	.30
1923 : 1945	.20
1923 : 1946	.26
1923 : 1947	.17

In Fabricant's study of 38 industries for 1909-37, where the rank correlation coefficient between wages and productivity was only .22, wages rose more rapidly than productivity in all but eight industries. How could this occur, if productivity was the prime cause of wage adjustments? It was suggestive that for the same industries there was a rank correlation of .87 between wage costs per unit of output and manhours per unit of output.

The Role of Prices. Changes in wage structure are not related to productivity unless price changes are neutral or contributory. If product prices rise, then wages tend to rise despite little increase in productivity. If productivity increases are compensated by price decreases, wages may not rise. The importance of prices, and the crucial importance of the terminal year in comparisons, are shown in two studies of manufacturing as a whole: Spurgeon Bell found that productivity gains were greater than wage increases from 1919 to 1938, and Clark Kerr found that the gains in both were equal from 1919 to 1945; but prices were lower in 1938 than in 1919, and about double the 1919 level in 1945.

Wage-Value Productivity Comparisons. Prices can be included if wages are compared with value productivity, rather than physical productivity: $\frac{P \times O}{MH}$. Then rank correlation will not be affected whether productivity gains go into price declines or wage rises; and the effects of economic forces will be visible when the motivating force for wage changes comes from prices.

The 1939-53 Period. Percentage changes in sales per manhour (a measure of value productivity if price and physical productivity data are lacking) for 20 two-digit manufacturing industries in 1939, 1947, and

1953 are shown in Table III. The following rank correlations were computed:

Rank Correlations Between Value Productivity,
Physical Productivity and Hourly Earnings
in 20 Manufacturing Industries

<u>Values compared</u>	<u>1939-47</u>	<u>1947-53</u>
Sales per manhour with average hourly earnings	.68	.58
Output per manhour with average hourly earnings	.19	.65
Output per manhour with sales per manhour	.06	.70

The correlation between sales and earnings is high. It is also apparent that the high correlation between physical productivity and earnings for 1947-53 is explained by the high correlation between output per manhour and sales for that period.

Uniformity of Wage Movements. An interesting aspect of Table III is the narrow range of wage increases, from 30 to 48 per cent with the single exception of apparel (18 per cent). Forces affecting wages in general outweighed factors acting on individual industries.

Offsetting Factors. Even a close correlation between value productivity and wages is not a perfect indicator of the influence of economic forces on wages. (1) Value productivity reflects an industry's ability to pay, but not if an increase in value productivity is accompanied by an increase in capital or material costs. (2) The proportion of labor costs to total costs is also an important economic factor in wage determination. (3) The cost of living is important in two ways. Insofar as general price rises create upward pressure on wages, the rank correlations between value productivity and interindustry wage changes will be reduced, since the rise in wages will apply to all industries. Also the cost of living,

in a period of rapid rise, has an important influence on the formulation of wage demands by unions. (4) The data available are average quantities, but the determination of average hourly earnings has marginal implications, at least in competitive industries.

Conclusions. The conventional measure of the impact of economic forces on wage determination, the rank correlation between physical productivity and wages, has at least two major drawbacks: productivity increases may lead to falling prices rather than rising wages; and demand factors working through price changes may raise wages without comparable productivity changes. Both of these disturbing factors are eliminated by the employment of value productivity rather than physical productivity.

The high rank correlation between value productivity and wage differences among industries makes a good case for the importance of economic determinants of wages. But no light is thrown on causes, and these findings do not preclude an important or even dominant role for unionism.

John E. Maher, "Union, Nonunion Wage Differentials," American Economic Review, June, 1956.

Investigations of the influence of unions on wages have had many contradictory results, some of them attributable to differences in time or industries covered. But they all employed a highly unreliable measure of wages (hourly earnings), and contained in addition so many uncontrolled variables that it is doubtful if any differentials could be attributed to unionism. In this study, a sample of 11,000 union and nonunion workers in 232 plants was selected from a universe of seven industries with over 200,000 employees on the basis of comparable occupation, industry, geographic area, and plants of the same size. Rates were compared and not earnings, excluding incentive workers from the sample, but since union-nonunion variation was not apparent here, no bias resulted. Care was taken to eliminate any bias from differential sex composition of the union and nonunion work forces; where both sexes were employed in an occupation they were treated as separate groups.

Within each industry and locality, union and nonunion plants of comparable size were selected. Within each plant, a simple arithmetic average was taken of the wage rate paid to time workers in each occupation. It was thus hoped to eliminate the effect on wage differentials of premium payments, geographic influence, variations in plant size, and quality of work force, which had entered into and confused the results of previous studies.

Results.

(1) In all seven industries, of 410 rate comparisons, 233 showed a positive union differential, a significant number of instances. However,

for each industry separately, at a 1 per cent level of significance, the number of positive differentials was significant in only one, furniture, and close to the significant level in footwear. In furniture the advantage lay with union workers; in footwear, with nonunion workers.

(2) Testing the mean differential for each industry, at a 1 per cent level of significance, only in the furniture industry was the mean differential of 7.57 cents suggestive of union wage rates significantly higher than nonunion rates.

(3) To explore the possibility that unions might be more effective in highly paid occupations where there is greater specialization and inelasticity of demand, a correlation between rate levels and differentials by industry was computed. None was significant except in the automotive parts industry, where the correlation was negative (perhaps indicating that the unions exerted themselves more in behalf of the lower paid workers).

(4) Another relationship that might show the influence of unionism is that between the size of differential and the degree of unionization in the city area; as unionization progresses, competition in both product and factor markets from nonunion plants decreases, thus perhaps permitting unions to drive a better bargain. None of the coefficients was significant at the 5 per cent level.

(5) A final hypothesis was that the size of differential was related to the size of plant: it might be argued that large and small nonunion firms will pay the same competitive wage to the same kind of labor, while union firms may be compelled to pay higher rates in larger

establishments. Thus the union-nonunion differential would be larger in larger plants. Neither of the values of "z" (in two industries) nor three of four correlation coefficients was significant at a 5 per cent level; in footwear, the coefficient .676 was significant between levels of 1 and 2 per cent.

Timing of Wage Changes. The findings that no difference existed between union and nonunion rates in five industries, that there was a positive union differential in one and a negative differential in the last, support the received theory that there are no significant differences in periods of equilibrium. However, in periods of disequilibrium, of rapid wage change, union-nonunion differentials may develop. It might be expected that union rates will lead, but anticipatory action by nonunion firms cannot be ruled out. In an inflationary period, union rates may adjust more slowly than nonunion.

Examination of the wage chronologies in the seven industries for 1950, before the impact of the Korean war, and thereafter, indicates that all these situations occurred. For the economy as a whole, the first seven or eight months of 1950 were stable: the industries in our sample which showed no significant differential were surveyed in that stable period. The furniture industry, with significant differentials favoring union workers, was surveyed in October, when all wages were going up under the impact of the Korean war. The footwear industry was surveyed in September, in the middle of a continuous rise in earnings which began in July and ended for them in November; the reason for the better showing of nonunion workers was that most union increases were confined to the month of October. When in October the largest firm in the industry

negotiated an increase three or four cents higher than the earlier nonunion rises, the nonunion firms generally responded with a second increase.

Conclusion. For the industries and occupations studied, there were no significant differentials between the rates of workers in union and nonunion plants. In the two instances where significant differentials appeared, they were found to be attributable to lags in the wage movements of one group behind the other.

John E. Maher, "The Wage Pattern in the United States, 1946-57,"
Industrial and Labor Relations Review, October, 1961.

The existence of pattern bargaining has long been recognized. The aim here is to define and measure it over an extended period.

Major Participants. Eleven industries have been prominent in pattern bargaining: steel, automobiles, aluminum, farm machinery, electrical equipment, rubber, copper, aircraft, petroleum refining, meatpacking and ship-building. Another prominent industry, coal mining, does not conform to the pattern because it has had much larger wage increases, the only explanation for which seems to be John L. Lewis.

The interrelation of these key bargainers is based on: the input-output nexus: similar technological and economic structure (producers' or consumer durable goods; high degree of concentration); geographical concentration, with common markets for labor; concentration of the workers in a few, large unions, several of which have been engaged in long-standing rivalries (Machinists and Auto Workers in aircraft; Steelworkers and Mine, Mill and Smelter Workers in copper, etc.)

Wage Conformity. The variety of economic forces impinging on these industries -- productivity, product prices, profits, elasticity of demand for output, substitutability of factors -- might have been expected to yield varying changes in negotiated wages. Instead, one factor seemed to dominate: changes in wages of workers in "comparable" employment.

E.g., in 1946, of 19 key bargains in the industries listed above, 16 settlements granted wage increases of 18-19 cents per hour;

in 1957, 15 of the total 19 included wage increases of 12-15 cents per hour (Table 3).

The wide diffusion of the key pattern in agreements throughout the economy can also be traced, through the Bureau of Labor Statistics Current Wage Developments (Table 4). Since there is little evidence that significant wage differences exist between the rates of comparable union and nonunion workers, the pattern probably also spills over into non-unionized sectors.

Conclusions. 1. For the postwar period, a "demonstration" effect would have to be included in any explanation of wage movements.

2. The fact that there are "central bargainers" in the economy may require that the wage, in any model of the economy, be given as an exogenous variable. It is uncertain, however, whether the movement of the wage level is different under collective bargaining than it would be in its absence.

3. It is unlikely that the diverse circumstances of industry would, in the absence of pattern bargaining, have yielded the results observed.

4. Whether or not the average wage level would have risen by the same amount from 1946 to 1957 without bargaining, it can be asserted that the dispersion of increases has markedly decreased as a result of bargaining.

5. The uniformity of changes in wage rates suggests that an index might be built from negotiated magnitudes rather than from earnings data, which are a catchall for changes in the structure of wages as well as for changes in wage levels.

6. The practice of negotiating flat across-the-board wage increases has made skilled labor relatively cheap, and may have contributed to structural unemployment among the unskilled.

Robert Ozanne, "Impact of Unions on Wage Levels and Income Distribution," Quarterly Journal of Economics, May, 1959.

The author takes issue with the bulk of professional academic opinion that unions have little or no influence on wage levels and income distribution.

Criticisms of Earlier Studies.

1. The studies of P. Aglas, Dunlop, Garbarino, Ross, and Levinson were too early to include the full impact of post-World War II bargaining (not until 1946 did union bargaining in mass industries begin).

2. Analysis of distributive shares has been unsatisfactory because unionists are only one-quarter of the total 60 million employees. Levinson's removal of corporate officers took care of only a small part of the non-unionists. Moreover, total share income does not allow for change in the number of employees. Average income per employee avoids this difficulty.

3. Interindustry comparisons have also failed to isolate unionism from all the other causes of wage changes. Unionism was weak in Garbarino's selected period (1923-40). And Maher's study of union and nonunion rates in the same occupations did not eliminate unionism as the initial cause of rises which were then followed by nonunion firms in the same area.

Period Comparison Method. Although it is impossible to find a perfect device, this method, used by Rees, avoids most of the pitfalls. Wage gains in two comparable periods, one union and the other nonunion, are related to per capita income gains in each period. (In Rees' steel study, the periods were, however, too different for effective use: the bulk of the second period, 1939-48, was characterized by rigid wage and price controls; nor, in the first period 1914-20, were 1918 and 1919 nonunion years in steel.) The periods used here are the prosperous ones

after both world wars, 1923-29 and 1947-57.

Wage Behavior. The hypothesis is that the greatly increased proportion of union members in the post-World War II period, 67 per cent of all production workers in 1956 compared with only 11 per cent in 1929, has substantially altered wage patterns, and has given the wage earner in manufacturing a greater share of the national income than he received in the 1920's.

Manufacturing. Average hourly earnings in real dollars of production workers in manufacturing moved very differently in the two periods:

1923-29: from \$.82 to .89, an annual rate of increase
(compounded) of 1.375 per cent

1947-57: from \$1.51 to 2.00, an annual rate of 2.80
per cent

Output per man hour in manufacturing was higher in 1923-29, it should be noted, than in 1947-53: 4.64 per cent per year, compared with 3.45 per cent.

What was the relative gain in production workers' incomes? If gain in average annual per capita personal income is taken as 100 in each period, the figures for all employees, white-collar workers and production workers are as follows:

Percentage Comparisons of Gains in Average Annual Income^a

Gain in:	Nonunion period 1923-29	Union period 1947-55
Average annual per capita personal income	100	100
Average annual compensation per full- time employee (all inds.)	71	134
Average annual income per white-collar worker in manufacturing	157	143
Average annual income per production worker in manufacturing	42	144

a. Figures expressed as per cent of gain in per capita income, constant dollars.

Production workers in manufacturing showed the most striking gains.

Other Industries. With the exception of building construction, all the following groups showed greater relative wage gains in the second period, when unionization was higher:

	1923-29		1947-55	
	<u>Income</u> <u>gain</u>	<u>Per cent</u> <u>unionized</u> <u>1929</u>	<u>Income</u> <u>gain</u>	<u>Per cent</u> <u>unionized</u> <u>1946</u>
Per capita personal income	100		100	
Average hourly earnings				
Class I railroads	93	45	197	80-100
Bituminous coal	negative	37	170	80-100
Printing	148	63	179	80-100
Building construction	231 ^a	27	215	80-100
Manufacturing (production workers)	79	11	141	67

a. Union rates

The building case, an apparent exception, may be explained by the fact that the early wage figures are union scales, which in practice were limited to the large cities, where unionism was concentrated.

Market Demand. There was a significant shift in the relation between wage changes and market demand from the nonunion twenties to the union post-war period.

Comparison of Wage and Employment Changes^a
in Two Periods

	<u>1923-29</u>		<u>1947-55</u>	
	<u>Employment Per Cent</u>	<u>Wages Per Cent</u>	<u>Employment Per Cent</u>	<u>Wages Per Cent</u>
Manufacturing ^b				
Production workers	.36	.73	.83	2.85
Nonproduction workers	.14	2.74	3.92	2.83
Bituminous coal:				
Production workers ^c	-5.47	-3.62	-9.08	3.37
Class I railroad workers ^c	-1.78	1.61	-3.03	3.90
Building construction workers ^c	3.63	4.23 ^d	3.30	4.26
Printing trades workers ^c	----	2.72	.803	3.55

a. Annual compounded rate of increase.

b. Average annual incomes, constant dollars.

c. Average hourly earnings, constant dollars.

d. Union wage scales.

Distributive Shares. The fact that "employee compensation" gained substantially in relative terms during 1947-56 should raise serious doubts about the commonly expressed notion that the labor share remains constant. It is hazardous to draw conclusions about the notoriously volatile profit share. In any case, it may be understated because of the accelerated depreciation permitted by the lax laws of 1954.

Comparison of Income Gains by Distributive Shares

	Income Gains as a Percentage of National Income Gain (constant dollars)	
	Nonunion Period 1923-29	Union Period 1947-56
National income, unadjusted	100.0	100.0
Employee compensation	100.7	129.5
Corporate profits before tax (adjusted for inven- tory change)	176.5	106.9
Corporate profits before tax (unadjusted)	182.4	57.1
Interest	157.3	286.6
Rent	131.6	61.7
Unincorporated business income (adjusted)	-----	21.4
Business and professional	76.2	62.7

Conclusions

The following comparisons are consistent with substantial collective bargaining impact on income distribution: (1) Real average hourly earnings of production workers rose over twice as rapidly in the union period as in the nonunion period, although productivity increases were greater in the nonunion period. (2) Average annual compensation per full-time employee, and a fortiori per production worker in manufacturing, rose less than per capita personal income in the early period, but more in the union period. Production workers fared better than white-collar workers in the union period, less well earlier. (3) Three out of four other groups, partially organized in the twenties, fared better in the later, more highly unionized period. (4) Wage movements in the union period show surprising independence of the market demand for labor. (5) The share of employee compensation rose in the union period.

The period comparison will never provide "proof" since the observations

are too few to eliminate random fluctuations. However, the data are consistent with an appreciable degree of trade union influence on income distribution. If 1958 had been included, the figures would have accentuated the point, since profits declined while wage rates rose, in the face of unemployment and inflation.

Comment by Lowell E. Galloway, Quarterly Journal of Economics, May, 1960.

Ozanne's criticism that the "distributive share approach looks not at average income per employee, but at total share income" assumes that the significant measure of unions' impact is their performance in obtaining higher per capita income for their employed members, and not as a broad social movement. The distributive shares approach is not in error, but merely a different emphasis.

Secondly, the lack of correlation between the movements of employment and wages in selected industries in the union period is consistent with the operation of market forces; employment changes could have reflected primarily movements along the labor demand functions, rather than shifts in the labor demand functions or their perfect inelasticity.

The fact that strong labor unions may be able to increase per capita income of their employed members does not demonstrate conclusively that they can improve the relative lot of their entire class. Nor does it demonstrate conclusively that collective bargaining has supplanted market forces.

Reply by Robert Ozanne, Quarterly Journal of Economics, May, 1960.

The distributive shares approach does not isolate unionism from other factors determining employee compensation: (1) changes in farm technology which transfer farm entrepreneurs into urban employees; (2) increased industrial productivity which reduces the proportion of factory workers in the economy; (3) degree of competition in the product market which may vary the profit and labor shares; (4) changes in consumer tastes in favor of nonemployee services.

No normal demand curve or market forces operating through movements "along the demand function" can account for the following: rising wage rates in coal mining and railroads accompanied by growing unemployment; rising wages for blue-collar manufacturing employees accompanied by stable employment; wage increases for white-collar manufacturing employees of the same magnitude as those for blue-collar workers while employment rose over 30 per cent in the white-collar group and was practically stable in the blue-collar group. Once collective bargaining has raised wage rates, a movement along the demand curve could (though it probably does not) explain reduced employment in coal mining.

With the last statement, one can only agree. The claim here was merely that the limited data presented are consistent with an appreciable degree of trade union influence on income distribution.

Martin Segal, "Unionism and Wage Movements," Southern Economic Journal, October, 1961.

The wage pattern in manufacturing in the postwar period, until 1951-52, was probably best explained by pressures of demand, as Levinson stated in Study Paper No. 21, but thereafter divergences in industry movements seemed to suggest other factors. Levinson found a significant relationship between wage changes and the level of profits and the degree of competition in the product market, but none with union strength. New and more precise data on the extent of collective bargaining indicate that emendation of Levinson's findings is in order.

The Bureau of Labor Statistics estimates of union strength by industry, for 1946, used by Levinson were ranges (e.g., 40-59 per cent union coverage). In 1958, point estimates were published for the first time. For Levinson's 19 industries, new correlations have been computed (see Table II) in which the association between earnings and union strength is significant in five out of six years, and stronger in most years than the correlation with profits and concentration ratios.

Union strength supplies an essential link in an interpretation of post-1951 wage behavior which runs as follows: In oligopolistic industries, which are generally highly organized, unions had not only numerical strength but market power, in the sense that they could extract substantially higher gains, although there was no shortage of labor supply, than those obtained in the industries which faced strong competitive pressures in the product market. The association between wage increases and profits is another element in the picture. In 1952-58

TABLE II

Simple Cross Section Correlation Coefficients
Between Changes in Straight Time Hourly
Earning and Selected Variables
in 19 Manufacturing Industries
1952-58*

Year	Straight time earnings on		
	(A) Profits before taxes	(B) Concentration ratios	(C) Union strength
1952-53	.550	.423	.625
1953-54	.628	.463	.502
1954-55	.514	.383	.591
1955-56	.055	.428	.325
1956-57	.546	.607	.511
1957-58	.392	.549	.706

*The 5 per cent level of significance is 0.4555; the one per cent level is 0.5751.

profits, measured as the rate of return on stockholders' equity, were strongly correlated with concentration ratios; this was the permissive condition for negotiating large wage increases. (In Garbarino's framework, changes in manhour productivity were the permissive variable in concentrated industries.) If, however, oligopolistic firms "have what amounts to a reserve of unliquidated gains from unmade price advances" (Galbraith) -- if they can successfully respond to labor and material cost changes by upward price adjustments, the relation between wage changes and physical productivity becomes attenuated and it is the relatively high profitability of the firm that both permits and stimulates union-negotiated wage gains. There was, in fact, no significant relationship in 1952-58 between wage changes and manhour productivity increases.

In some cases, segments of industries with low concentration shared the prosperity of the firms which dominated the particular "wage contour" and, also dealing with the same unions, followed the high-wage bargains. In other industries with above-average gains, other permissive factors could also be traced: e.g., in paper products, product demand is inelastic; profits were high in 1952-58; labor costs are a small proportion of total costs.

Conclusions: Instead of singling out the auto and steel settlements in 1955-56 as did the Eckstein Report (Staff Report on Employment, Growth and Price Levels, prepared for the Joint Economic Committee, U.S. Congress, Dec. 24, 1959), the interpretation here is that wage behavior in all the oligopolistic industries was essentially a joint product of corporate and union power. Unionism also constituted an important link, in 1952-58 when there was no labor shortage, between

wage movements of firms in concentrated industries and others in the "wage contour." Unions were also an important influence on wage behavior in some nonconcentrated, but highly organized, industries in which the economic environment placed unions in a comparatively strong bargaining position. Unless one places considerable emphasis on the bargaining power of unions, it is difficult to account for the divergences in the wage behavior which developed among manufacturing industries, and for the fact that the 1952-58 wage increases resulted in almost all cases in substantially higher unit labor costs.

James S. Duesenberry, "Underlying Factors in Postwar Inflation," in Wages, Prices, Profits, and Productivity, 1959.

The complexity of postwar inflationary pressure is illustrated by reference to the diverse movements in prices and profits. It is concluded that wages were the primary instrument of inflationary pressure, largely because of the conflicting trends in profits and prices. Strictly cost-push or demand-pull theories provide insufficient explanations. However, demand-pull was predominant with respect to wage and price increases in trade and service sectors, while trade union pressure has been more important in manufacturing, construction, utilities and transport. It is argued that both sources of pressure interact in determining both the extent of wage increases in unionized industries, and the secondary effects of those increases on other sectors.

Demand-pull theory may be summarized as follows: Excess demand results in inflationary pressure because of: (1) insufficient industrial capacity, and/or (2) insufficient labor supply. Continuing inflation will take place only if demand at constant prices tends to grow faster than industrial capacity or labor supply, adjusted for productivity increase.

The cost-push theory, an addendum to the above, attempts to explain inflationary wage pressure in circumstances which the above theory implies. Trade union pressure alone can be inflationary would be non-inflationary, only if (a) the whole labor force is organized or (b) unions exert indirect pressure on the wages of unorganized workers. Under these conditions trade unions, by threat of strike, etc., force up wages in spite of insufficient demand. Unions cannot push wages up

indefinitely unless there are other factors which tend to generate wage increases in other sectors. The post-1952 limitation of the money supply was a factor limiting demand, though not enough to prevent inflation.

Service prices have moved steadily upward since 1945, and since 1951 have increased more rapidly than the Consumer Price Index. Wage increases in service industries have been only slightly below those in manufacturing.

Agricultural prices dropped significantly between 1951 and 1957.

Raw materials prices remained nearly constant between 1949 and 1957, with some fluctuations during and after the Korean War.

Retail margins on durable goods declined to a marked extent over the period, with some fluctuation.

Despite some fluctuations, wages and labor costs per unit of output have risen steadily since the war. Wages have risen faster than productivity.

Profit margins in manufacturing fluctuated with the business cycle over the period, but showed no secular rise or fall. The net effect of profits on prices was negligible.

Therefore, between 1946 and 1956 prices have risen primarily because labor costs have risen. The ups and downs of raw-material prices and profit margins sometimes reinforced and sometimes offset the trend in labor costs but did not contribute much to the upward trend in prices.

Although the most spectacular wage increases were those negotiated by the large unions, it is clear that the increases gained by these unions did not significantly exceed those gained across the board. Exponents of

the cost-push theory must explain why wage increases have been so uniform. Such an explanation is difficult to make.

However, the demand-pull analysis is hard pressed to explain the size of wage increases, given the existence of some labor shortage. The comparison of the 1923-29 period with the 1951-56 period shows that the rate of wage increase of the latter period was roughly five times that of the former. Thus demand-pull is also unsatisfactory as a single explanation.

An alternative explanation is: Excess demand for labor pulled up wages in the sectors in which trade unions were weakest, and trade unions pushed up wages in sectors where excess demand was weakest. The largely non-unionized service industries have raised wages because of insufficient labor, needed because of rapidly increasing demand for services. Unions pushed up wages in manufacturing, where demand has not increased rapidly.

Given a situation of low unemployment, there may be shortages of certain types of labor, and employers may raise wages across the board to maintain internal wage structure. Similarly, employers may raise wages to reduce turnover under the same conditions. Thus wage pressure by trade unions will be more effective when unemployment is low.

Further, the influence of union wages on the wages of unorganized labor depends on market conditions, and the existence of a strong market for labor increases that influence.

Three basic factors responsible for postwar demand are identified:

(1) Situation in 1945: both businesses and households had high levels of liquid assets and low indebtedness, combined with deteriorated capital stocks and consumer durables, respectively. These factors,

combined with the expansion of government services, led to a strong demand situation.

(2) Population growth: high marriage and birth rates helped to sustain demand, particularly with regard to housing.

(3) Effect of government spending: Korean War spending appears to account for about one-half of the increase in aggregate real demand between 1950 and 1953. The considerable decrease in federal government spending after 1953 was largely offset by increases in private investment and the increase in state and local spending. However, the decrease in federal spending seems to have been an important constraint on the rate of increase in demand.

A policy of controlling demand in order to control inflation would tend to decrease rates of wage increase in the unorganized sectors, at least until differentials widened. Such a policy would have less effect on organized labor.

However, such a policy would be costly in several ways: (a) by lowering the rate of growth in the economy; (b) slowing the rate of productivity increase; (c) increasing unemployment.

United States Congress, Joint Economic Committee, Staff Report on Employment, Growth, and Price Level, 1959, Chapter 5, pp. 130-158.

The Service Industries. Prices of services were a major source of postwar inflation. From 1947 to 1958 they rose over 50 per cent while the consumer price index rose only 29 per cent. Between 1951 and 1956 the entire rise in the index was due to service prices.

Service industries also provided a major source of employment expansion. In the 1953-57 period they expanded at 3.4 per cent, nearly twice the rate in trade, the next highest sector. After 1953 the great bulk of employment expansion in the entire economy can be traced to the services sector.

Services increased as a proportion of consumer purchases from 32 to 38 per cent between 1948 and 1957. From 1955 to 1958, while real GNP rose 1.5 per cent, output of services rose 14.5 per cent.

The price index for medical care has risen 65 per cent since 1948, or about 5 per cent per year. The rise was due largely to increased demand coupled with severe shortages of medical personnel. There has been a decrease in supply of medical services per capita since 1948 -- including doctors, dentists and hospital beds.

Prices of services using unskilled labor have also risen by 3 to 4 per cent per year. The reasons for the increase are not entirely clear since: (a) competition among firms has been severe; (b) employment has increased slowly; (c) wages have risen less than in manufacturing. The underlying cause has probably been increased cost per unit of output, resulting from wage increases higher than productivity increases.

The Labor Market. The strong upward movement of industrial wages

presents two questions: (a) To what extent have wage increases been a response to demand in the labor market? and (b) Have wages been inflexible downward during recessions? And if so, is this evidence of the existence of "market power" in the labor market?

The greatest amount of inflationary pressure occurred in three periods: 1946-48, 1950-53, and 1955-57. Demand pressures in the labor market were stronger in the first two periods and weaker in the last, as indicated by 3 per cent unemployment in the former and 4 per cent in the latter. Nevertheless, unemployment in the 1955-57 period was not so high as to preclude demand pressures, at least in some sectors of the economy.

Over the course of the business cycle, the rate of wage increase (particularly in mining, manufacturing, and construction) was related to the unemployment rate; wages increased most when unemployment was lowest. Therefore, the evidence supports the conclusion that the degree of demand pressure in the labor market does have an important effect on the rate of change in the wage level.

In itself, this is of limited significance. More important is the fact that wages showed a very high degree of downward rigidity, and a tendency to continue to move upward even in recessions. Does this constitute evidence of the exercise of market power by strong unions? Probably not: during recessions in the 1920's, when unions were weak or nonexistent wages were rigid downward, and perhaps rose slightly. Historically, only in periods of severe depression have wages fallen.

However, the rate of increase of wages has slowly moved upward in postwar recessions: In 1954 earnings rose 2 per cent; in 1958, 4 per cent.

The continuing upward movement is more suggestive of the influence of market power than downward inflexibility. Past evidence indicates that unemployment would have to average at least 6 per cent to keep the rate of wage advance no greater than the rate of productivity increase.

The Structure of Wages. Equally important to an understanding of wage movements is an analysis of the relationship between wages in different industries. The changes in wages in 26 separate industry groups¹ were tested against several possible explanatory variables: changes in employment, output, productivity, profits, concentration ratios (a rough measure of the degree of competition in the product market). It is important to note that the range within which any differentiating variables could operate is relatively small, because wage movements among the industries were very similar: in the entire postwar period 1947-58, almost two-thirds of the sectors had increases falling within a range of 70 to 90 per cent.

The results of the tests were as follows:

(1) No significant relationship was found between annual percentage changes in hourly earnings and employment; (2) No important relationship was found between changes in wages and changes in productivity per production worker man-hour; (4) No generally applicable relationship was evident between union strength and wage increases. (5) Within the 19 manufacturing industries, the most important factors related to wage changes, particularly after 1951, were: (a) the level of profits, (b) the degree of competition in the product market.

1. Nineteen manufacturing, 5 mining sectors, class I railroads, and contract construction.

Nonmanufacturing Industries. In railroads and coal, employment and output dropped sharply and almost continuously during the entire postwar period. Yet the railroad workers enjoyed the greatest increase in wages of any of the sectors studied. Similarly, coal wages exceeded those in every manufacturing sector from 1947 to 1953, although they fell somewhat behind the average for all manufacturing after that time. Particularly after 1953, such rapid rises cannot be explained by tightness in the labor market, and the suggestion is strong that the market power of the unions had considerable influence in these sectors. In construction, strong unions combined with favorable market conditions to stimulate increases.

Wage patterns provide an important clue to the postwar wage inflation. "Pattern bargaining," the negotiation of agreements which closely follow "key" settlements, will be inflationary when the key settlement is negotiated in an industry where conditions are favorable for substantial wage gains, and then transferred to industries where conditions are less favorable.

Key agreements in steel and automobiles were generally followed by other concentrated manufacturing industries regardless of conditions in the product market. Coal and railroads met or exceeded the pattern. However, nonconcentrated manufacturing industries (textiles, clothing, leather shoes), where product market competition was severe, fell far below the pattern.

Developments from 1955-58 are particularly interesting. In the summer of 1955, the key bargain was negotiated in the automobile industry, which was enjoying its second most profitable postwar year, with production of 7 million cars, and profits of 46 per cent before taxes and 21 per cent after

taxes. The contract included liberal wage increases and additional automatic increases for the next three years. Steel negotiations in 1955 and 1956, both very profitable years, also resulted in long-term settlements even more favorable to the workers. These two patterns continued to be operative and influential in the declining years of 1957 and 1958. On the other hand, a lower settlement in automobiles in 1958 did not seem to hold back the rate of wage increases in the following year, when recovery was under way.

Conclusions. (1) At least up to 1951, with the exception of the 1949 recession, the general level of employment and profits was sufficiently high in virtually all industries to suggest that most, if not all, of the wage increases were caused by pressures of demand. (2) After 1951, divergences in wage movements began to develop, based primarily on the level of profits in various industries, but in a few industries it was attributable to union strength. (3) Beginning with the 1954 recession, the role of collective bargaining appears to have been much stronger, though largely in an indirect manner. The upward wage movements of 1957-58 cannot be explained on the basis of demand for labor or output, particularly in coal and railroads. However, it is true that the key bargains in steel and automobiles were negotiated at a time when demand pressures were relatively strong. But it is noteworthy that these two major industries were willing to negotiate substantial wage increases into the future because they had no serious concern about competition. It was, then, a combination of market power in both the product and labor markets, initiated by rising demand and high profits, which accounted for the developments in these

industries. Other industries with high profits and concentration in the product market tended to follow the pattern, whether they were union or nonunion. Where the economic environment was unfavorable, the pattern broke down, even where unionism was strong.

John T. Dunlop and Melvin Rothbaum, "International Comparisons of Wage Structures," International Labor Review, April 1955.

The extent and size of wage differentials are among the major distinctive features of the wage structure of a country.

Interindustry Differentials. The ranking of industries indicates a remarkably similar structure of interindustry wages in Italy, France and the United States. In general, the higher wage industries are the expanding or oligopolistic industries or those with a high proportion of skilled labor (aircraft, steel), and the lower-wage industries are the older or more competitive industries or those with a low proportion of skilled workers (shoes, textiles, food processing).

The range of differentials varies considerably from country to country, with the largest percentage differentials in the United States. In 1938-52, in the United States, differentials varied with changes in the general level of employment and with changes in the extent of price inflation. Of the two factors, employment seemed more important: as the labor market tightened during wartime, interindustry differentials narrowed; when the labor market loosened in the postwar period, differentials remained stable despite marked inflation.

In Italy, severe inflation resulted in the contraction of differentials, despite heavy unemployment, in part because of the uniform administration of cost-of-living increases under the centralized collective bargaining mechanism.

Differential wage movements among broad sectors of the economy (agriculture, manufacturing, construction, etc.) are best explained by the general level of employment and by differences in the growth of employment in the particular sectors.

Regional and skill differentials narrowed in the three countries between 1937-40 and 1952. The North-South differential in the United States fell from 26 per cent in 1931-32 to 16 per cent in 1945-46, with most of the contraction occurring in 1940-46.

Conclusions (in part)

1. The technology of production and the nature of product market competition, including foreign trade, largely explain the similarity of ranking in the interindustry wage structure of Italy, France and the United States.
2. Inflation tends to narrow all wage-structure differentials in percentage terms, particularly occupational differentials.
3. Full employment also tends to narrow differentials in percentage terms, but this effect is relatively small compared with that of inflation. High employment is particularly significant for regional differentials. Periods of unemployment are associated with a widening of differentials.
4. When centralization of decision making is high, formal wage structure differentials tend to be low in percentage terms.

Pamela Haddy and N. Arnold Tolles, "British and American Changes in Interindustry Wage Structure under Full Employment," Review of Economics and Statistics, November, 1957.

How has the full employment of the war and postwar period affected the structure of wages? Cullen found great stability in the American interindustry wage structure for 1939-49, as well as for longer periods. The first test was selected to provide the greatest possible comparability between British and American wage data, and the method and data used by Cullen. Average weekly earnings were used, instead of Cullen's annual earnings; but since he showed that for the United States, at least, the wage ranking of industries was substantially the same whether annual or hourly earnings were used, it was assumed that weekly earnings would also be comparable.

Rank-Order Coefficients of Average Wages by Industry
(28 similar industries)

	<u>U.K.</u>	<u>U.S.</u>
Prewar ^a and 1946	.903	.820
1946 and 1951	.958	.888
Prewar ^a and 1951	.879	.823

a. 1938 for U.K., 1939 for U.S.

The British wage structure appeared to be even more stable than the American. There was a slight suggestion that more changes occurred in wartime than in subsequent years. But the impressive evidence was that neither the war nor the postwar full employment materially changed the interindustry wage structure in either country.

In both countries, relative dispersion decreased.

Relative Dispersion of Interindustrial Earnings
(Standard deviation divided by mean)

	U.K.	U.S.
Prewar ^a	24.9%	18.60%
1946	20.8	13.03
1951	19.3	15.30

a. 1938 for U.K., 1939 for U.S.

The second test produced very different results. Eighteen industry groups, two-digit industries in American terminology, were selected, including virtually the entire area of British employment except distribution and services. Nonmanufacturing industries included were agriculture, transport, building, railroads, dock work, gas, electricity and water. Men's and women's earnings were separated.

Rank-Order Coefficients of Average Weekly Earnings,
18 Industry Groups, U.K.

	<u>1938 and 1951</u>
Males	.4964
Females	.0110

The results indicated a substantial alteration of the interindustry wage structure. Furthermore, while the same narrowing trend in the relative dispersion of earnings over time was evident as in the first test, the dispersions appeared much narrower in both years for the larger group. Women's earnings were more narrowly dispersed than men's.

Relative Dispersion of Interindustry Average
Weekly Earnings, 18 Industry Groups, U.K.
(Standard deviation divided by mean)

	<u>1938</u>	<u>1951</u>
Males	15.8%	11.9%
Females	11.4	9.3

When the nonmanufacturing industries were removed, the rank correlation coefficient for men rose from .49 to .83, but the fact that this made no significant change in the rankings of women's earnings (.01 and .02) indicated that the entire difference between the two tests cannot be ascribed to nonmanufacturing alone. (Another factor was the lower dispersion of earnings in the larger group, giving a greater impact on rankings to a change in a few industries. Also, Cullen's original selection of industries, used in the first test, was based on the existence of records for 50 years, and was probably a relatively stable group.)

The industries which produced the crucial changes in men's earnings differentials were readily identifiable: mining, up 8 places in the rank order; coal, up 7 places; textiles, up 7; transport and communication, down 8; and railways, down 14. When these five industries were removed, the rank correlation coefficient for men's earnings rose to .9 in the remaining 13 industries.

For women, shifts in relative position were more general and omission of the five biggest shifters (textiles, up $8\frac{1}{2}$; miscellaneous manufacturing, up $4\frac{1}{2}$; food, drink and tobacco, down 5; leather, down $7\frac{1}{2}$; and government service, down 12) raised the rank correlation coefficient to only .4.

As to why full employment altered the interindustry wage structure -- particularly, the identification of forces operating in a relatively small number of industries, and on the structure of women's earnings -- the changes in the skill mix and the apparent narrowing of skill differentials in full employment conditions seem to merit further study.

Conclusions

- (1) Average wages paid by different industries become more nearly uniform as an economy of the British or American type moves toward full employment.
- (2) Changes in the rankings of industry wage levels depend on how broadly industries are defined, and whether manufacturing alone is studied. Broadly defined industries exhibited great shifts in ranks.
- (3) Women's average earnings, among industries, altered more drastically than men's, under conditions of full employment.

OCCUPATIONAL

M. W. Reder, "The Theory of Occupational Wage Differentials," American Economic Review, December, 1955.

The hypothesis is that skill differentials narrow over time because a rise in the level of employment for all grades of labor reduces the supply of labor available for unskilled jobs proportionately more than it reduces the supply available for other jobs. This relationship assumes the prior absorption of a labor reserve -- i.e., full employment.

The Model. According to traditional theory, the employer obtains the labor supply he needs by varying the wage rate. However, another method is open to the employer: "quality" variations exist in job applicants and relative scarcities can be met by the varying of minimum standards for the job. The notorious stickiness of wages is one indication of the importance of quality variation in the labor market.

Where workers can be upgraded, there will be less need to change the general wage rate to attract workers. This will occur where skills can be easily acquired and costs of training are low.

If there is full employment, demand for skilled workers would tend to raise skilled rates. However, the possibility of training workers on the next lower skill level, and substituting them for skilled workers, will tend to limit the rise in skilled rates, and also to raise the rates paid in the lower-skilled group until substitution from below is again resorted to. At the bottom, no further substitution can occur, and only a change in the wage rate for the unskilled will augment the supply to the employer. If a labor reserve exists -- unemployed persons, or a variable labor force consisting of housewives, youths, etc., who will work if wages rise sufficiently -- then the increase in demand must be great

enough to absorb these groups before the hypothesis will be demonstrated.

Allegation of the existence of a labor reserve will evoke the question, why does not the unskilled rate fall until excess supply is absorbed? The answer lies in a social minimum wage -- existing by virtue of custom, by statute, or trade union policy -- below which labor will not be forthcoming.

Empirical Evidence. If the hypothesis were true, skill differentials would decline in periods of general labor shortages. The data presented by Ober and Douty show that skilled margins declined during both world wars, which is consistent with the hypothesis. However, there is no definite evidence that the differentials vary with ordinary cycles. This does not contradict the hypothesis because small changes are not usually sufficient to absorb the labor reserve.

Other evidence is the shift of workers from agriculture to industry, and from unskilled to semiskilled jobs which occurred in many countries during the world wars and in the postwar full employment. But the hypothesis does not seem to be reversible: skill margins did not widen during the depression of 1929-33 (although they did in 1920-21). This can perhaps be explained by the raising of the SM (social minimum) by the New Deal and by the organization in the thirties of unions of unskilled.

The theory is better, however, in explaining secular trends. The marked reductions in differentials over the past 50 years is what our hypothesis would predict. The substitutability of workers has been increased as the level of education has risen, because better educated workers are better able to acquire skills. At the same time, the decrease in the supply of unskilled labor has put pressure on the lowest rates.

The model can also be used to explain differences in wages in the various regions and among different countries. The substitutability of workers varies with educational levels and industrial structure. Thus, in the South, where educational levels are lower than in the rest of the country, we would expect the skill differentials to be larger. Furthermore, because manufacturing -- with its large proportion of semiskilled, easily-substitutable labor force -- is a small proportion of the Southern economic structure, we would again expect the differentials to be larger than elsewhere.

Because of the positive association of a high proportion of manufacturing employment and a high minimal level of education with per capita income, countries with wide skill margins should be "backward areas." The fact that the skill margin is substantially higher in the United States than in almost any country in Western Europe or Australia seems to challenge this theory. But the U.S. has not in fact had, at least until recently, the high minimum educational standards of most other Western countries. This has been due to the influence of the Southern states and, in the earlier period, to the mass of uneducated immigrants.

Alternative Hypotheses. Neither the government nor trade unions had much effect on the long-run decline in differentials or on the sharp decline since 1940 because:

1. There was no widening of differentials after the war as there was in Denmark and Italy, so apparently government policy did not narrow differentials more than market forces would have.
2. The phenomenon of wage glide indicates that market forces

restore wage levels that have been set too low by institutional forces.

As long as full employment exists, it is difficult to test the effect of unions or government over and above the effects of the market. The absence of unemployment suggests that wages have been set correctly. Where there is persistent unemployment and prescribed minimum rates are maintained, there is ample opportunity for nonmarket forces to alter relative wages.

Cyclical Variations in Annual Labor Income. A cyclical hypothesis based on annual income rather than hourly earnings seems to work better. Unskilled workers are more prone to cyclical unemployment than skilled workers, so that widening of differentials may show up if annual earnings are considered rather than wage rates, which are hard to cut when they are already very low. There is some evidence that inequality in annual incomes increased during the 1929-33 depression and declined in the subsequent recovery period 1939-44. Similarly, when the supply of labor in the unskilled categories increases more than in the others, we may expect the unskilled rates to fall and/or unemployment to rise. Both effects would lead to a fall in annual incomes of unskilled relative to the skilled. There is some evidence that this occurred in early 19th century England.

Philip W. Bell, "Cyclical Variations and Trend in Occupational Wage Differentials in American Industry Since 1914," Review of Economics and Statistics, November, 1951.

The traditional model of cyclical variation, which has occupational wage differentials narrowing in expansions and widening in depressions, is at best only a rough approximation. There are definite exceptions, for example, 1929-33, and in many industries there seems to be no logical pattern of variation.

Dunlop's findings on the 1928-1938 period ("Cyclical Variations in Wage Structure," RES 1939), which substantiated the conventional pattern, were defective because the widening of the interoccupational structure was accompanied by increased dispersion in the intraoccupational wage rates. Ober's study ("Occupational Wage Differentials, 1907-1947," MLR August 1948) was faulty because the years studied were too far apart and the sample was not consistent through the time periods. Thus his data may show a narrowing because an industry with a large differential is included in the early period but not in the later ones. Lebergott ("Wage Structures," RES 1947) tried to show that occupational differentials have narrowed by correlating wage rates with the percentage increase in the rates over the time period involved; this method gives no indication of the magnitude of the change in the structure. High correlation coefficients do not indicate whether the structures have changed very much or only very little.

Evidence from four sources was presented by Bell:

- (a) Bureau of Labor Statistics industry studies (600 occupations)
- (b) Interstate Commerce Commission hourly earnings of railroad workers (40 occupations) and monthly wages of seamen (Department of Commerce: 35 occupations)

(c) National Industrial Conference Board annual surveys of 25 industries

(d) Bureau of Labor Statistics union wage scales.

The periods chosen were: 1914-1920; 1920-1922; 1922-1928; 1928-1932; 1932-1940; 1940-1948.

Percentage changes in average hourly earnings for each occupation in each period were calculated. The array of per cent changes in each industry was divided into thirds and halves, and averages were taken on each of these breakdowns. If the average change in the top third of an industry was greater than the average change in the bottom third, its occupational structure was considered to have widened.

The results may be summarized as follows.

Wartime Expansions:

1914-1920: In all 9 industries studied (see Table 1), except for shipping on the Pacific coast, the bottom half of workers received greater percentage increases than the top half, by differences varying from 5-80 percentage points. Similar results were found in NICB and union scale data.

1938-1946: Across-the-board increases during World War II caused contraction in most of the 16 BLS industries, but the narrowing was negligible -- less than 5 percentage points -- in five of the industries.

Gradual Expansions:

1922-1928: No clear cut pattern of change in occupational differentials was evident. Out of 8 industries studied, 3 showed a definite relative

gain by higher paid males, 2 showed relative gain by lower paid males, and 3 showed about equal percentage changes. The NICB data show very slight gains by the unskilled relative to the semiskilled and skilled. The union wage scale data show little change in the occupational structure, although the percentage increase for journeymen in the building trades was slightly greater than for helpers and laborers.

1932-1938: There was a greater tendency toward contraction of differentials than in the 1920's. An exception is the NICB data, showing constant differentials for the period 1933-1936. In BLS data, in only one out of 13 industries did the spread tend to widen. "Sweated" industries experienced a greater contraction than others. According to the union data, there was a definite narrowing for the building trades but no change for printing.

Periods of Contraction:

1920-1922: Six out of the eight industries in the BLS data experienced a widening of the wage structure. The greatest widening occurred in industries which had contracted the most during the 1914-1920 boom, notably lumber, cotton, woolen and worsted goods. But the expansion was not in any case sufficient to effect a return to the 1914 pattern. One industry, boot and shoe, experienced a continuous narrowing. Similar results were obtained from the NICB data.

1928-1932: During the great depression, none of the 16 industries in the BLS surveys experienced a definite widening. In fact, in hosiery, some parts of iron and steel, in auto manufacturing, in silk and rayon goods, and in woolens and worsteds, the upper half of male earners received reductions more than 5 percentage points greater than the lower half.

NICB materials corroborate this evidence to some extent: in six industries, skilled workers' earnings fell more than the unskilled, and in four industries, their earnings fell less than that of the unskilled. In the union data, wages of laborers and helpers fell a little more (less than 2 percentage points) than journeymen; similarly, in book and job printing the lower paid workers had a greater decline than the higher paid. However, in newspapers, the decline was about the same for both groups.

Analysis of Empirical Evidence. The conventional model is at best only a rough approximation of cyclical wage variations. A few industries follow the model, notably, furniture, rubber, leather tanning, and finishing. On the other hand, agricultural implements, foundries and railroads maintained constant structures except in periods of sharp inflation. But in most industries there seemed to be no logical pattern for cyclical variations in occupational differentials.

In general, cyclical variations in occupational differentials depend upon employer and union wage policies (especially after 1933), the relative strength of each party during the different periods, and the influence of the government. Employer policies, to the extent that they depend on supply and demand factors, would work to reinforce the conventional model. But policies based on job evaluation schemes would tend to keep the structure constant. Furthermore, notions of equity might operate to prevent wages of unskilled from being cut because they are so low already. On the other hand, low wages may be cut more than those of skilled workers in order to compensate the latter for any lagging during the previous expansion. Union wage policies depend upon the type of union: industrial unions are likely to narrow the structure while craft unions adhere to

the status quo. Their effectiveness is likely to be greater during periods of expansion than depression. Government action through the National Recovery Administration forced a narrowing of differentials, but when the NRA was declared unconstitutional, differentials tended to expand again. Further narrowing came in the late 1930's with the passage of minimum wage legislation. The government policies which strengthened the trade unions, and the industrial ones in particular, helped to compress wage structures. In the absence of these factors, the volume of unemployment in the great depression might have resulted in widening of differentials.

The Trend in Occupational Differentials. There has been a long-run trend toward narrowing of the wage structure, but the extent and generality of it have been exaggerated by Ober and Lebergott. The occupations in the 10 ELS industry studies were ranked by wage rates for 1914 or 1922, and 1940. When the thirds and the halves were compared, little change was found to have occurred in the order of occupations. The occupational wage spread was nearly constant up to 1939 in book and job printing, machine shops, and railroads. Differentials widened in hosiery and for merchant seamen, but narrowed considerably for boot and shoe, cotton goods, parts of iron and steel, the building trades, and narrowed slightly in motor vehicles. The factors accounting for this trend are chiefly the leveling spirit in the U.S., combined with a higher average level of education; and possibly labor-saving machinery and the subdivision of labor. Forces which act to widen the structure or prevent it from narrowing are the greater supply of unskilled labor relative to skilled, craft labor union policies, and employer policies based on the desire to maintain efficiency, incentives, and morale.

H. Ober, "Occupational Wage Differentials, 1907-1947" in Monthly Labor Review, August 1948.

Ober considers two aspect of wage relationships, a cross-section review of current wage differentials by occupation and the long-run changes in these differentials.

For each industry, all available occupational rate data were expressed as percentages of selected unskilled jobs, i.e., janitors and/or hand truckers for the recent years and common labor for earlier years. Occupations were broadly grouped into three classes, regardless of industry: skilled, semiskilled, and unskilled. For each skill group, the median and interquartile range of the differentials were calculated.

The data were collected for 1907, 1919, 1931-32, 1937-40, 1945-47, although not on a strictly uniform basis.

Results: Cross-Section Data

The industries which employed unskilled labor under unpleasant and arduous conditions, or had no highly skilled jobs, showed a narrow spread between the skilled and unskilled -- less than 45 per cent. These were: mechanical, rubber goods, soap and glycerin, leather tanning, and copper alloying, rolling and drawing. Industries with high skill needs and pleasant conditions for unskilled workers exhibited wider skill differentials. These were the tool and die shops, hosiery, and garments. Where incentive earnings were prevalent among semiskilled workers, their earnings might be as high or higher than skilled time workers. In these cases, pressures might be generated to maintain some kind of a differential.

Analysis by Region

Industries located in the South generally showed wider rate spreads than

TABLE 1

Relationship of earnings of skilled, semiskilled, and unskilled
occupations in manufacturing, 1946-47. Average earnings of
janitors and handtruckers = 100.

Occupation	Median	Interquartile Range
Skilled	155	145-170
Semiskilled A	135	125-145
Semiskilled B	115	110-125
Unskilled A	115	105-120
Unskilled B	100	95-105

TABLE 2

Relationship between earnings of skilled and unskilled occupations
in manufacturing for selected periods.

Average earnings for unskilled occupation = 100

Median and Interquartile Range.

Year	Region									
	United States		Northeast		South		Middle West		Far West	
1907	205	180-280	200	175-245	215	195-235	190	170-250	185	165-200
1918-19	175	150-225	165	150-235	195	175-230	175	145-235	170	160-195
1931-32	180	160-220	175	155-215	190	165-235	170	150-215	160	145-170
1937-40	165	150-190	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1945-47	155	145-170	155	145-175	170	150-195	150	140-165	145	140-165

n.a./not available

elsewhere between skilled and unskilled workers. The range was smallest in the West. The differentials seemed to be influenced by the degree of industrialization in each region and by supply and demand pressures for unskilled labor. In the South, skilled rates were not much lower than in some northern regions; it was the unskilled rates which were below the rest of the country.

Analysis of the Trend

In 1907 skilled rates were about double those of unskilled workers. By 1947, they were only about one half as large. All regions experienced this narrowing, though some narrowed more than others. The periods in which the greatest declines occurred were 1907-1919 and 1940-1947. The decline was not a steady one; there was some widening of the structure in 1931-34. Additional data on wage rates in the building trades also exhibited a long-run decline in skill differentials from an index of 185 in 1907 to 143 in 1947. The trend observed in the building trades data is significant because bargaining is generally on an individual craft basis. Hence, there is less opportunity to be concerned with the general structure of wages, and the trend must reflect important factors at work.

Analysis of Cyclical Movements

In general, differentials narrowed during periods of expanding employment and widened during periods of recession. From 1907-1914, the differentials widened from 85- 99 per cent. From 1916 to 1920, they narrowed to 66 per cent, and then widened again to 80 per cent in 1923 where they stayed throughout the rest of the decade. The differentials narrowed at an accelerated pace during World War II and finally reached 43 per cent in 1947. The changes in the differentials seemed to be the result of the greater sensitivity of

unskilled rates rather than movements of skilled wages. An index of urban wage rates showed that between October 1943 and April 1947, skilled rates rose only 27.7 per cent whereas unskilled rates rose 35.7 per cent. This same pattern was evident in most of the regions. Movement of semiskilled rates generally fell between the skilled and unskilled, slightly closer to the unskilled, but occasionally changing by more than the unskilled.

A Note on Absolute Differentials

Absolute differentials did not always move in the same direction as relative differentials. For example in the building trades between 1907 and 1918, absolute differentials rose while percentage differentials were declining. In the periods of the first World War and immediately after, absolute differentials rose rapidly while relative differentials declined. Again, between 1938 and 1947, absolute differentials were constant whereas relative differences fell. Differences in movements of the two measures can be explained as follows: when uniform cents per hour increases are given all workers, absolute differentials remain constant and percentage differentials decline. If uniform percentage increases are granted all workers, relative differentials remain constant while absolute differences increase. If the increase in skilled rates is greater than in unskilled rates in cents per hour but is less in percentage terms, then the relative differentials narrow while the absolute differentials are increasing.

Note on Effect of Rising Prices

Rising prices change the value of cents per hour differentials. Absolute differentials may have to be larger during periods of inflation than in stable periods in order to induce people to acquire skills and training.

Earl E. Muntz, "The Decline in Wage Differentials Based on Skill in the United States," International Labor Review, June, 1955.

Muntz reviews the data presented by Ober showing the decline in the relative wage differentials between skilled and unskilled workers, and between journeymen and laborers and helpers in the building trades. In less than half a century, the differential has declined from 175 to 137.

1. The Rise of an Educated Working Class. The percentage of pupils of high school age enrolled in public and private schools has shown a substantial increase:

1889	-	7 per cent
1899	-	11 per cent
1909	-	15 per cent
1919	-	32 per cent
1929	-	51 per cent
1939	-	73 per cent
1949	-	77 per cent

The proportion of new entrants to the labor force with high school diplomas has also increased:

1929	-	29 per cent
1939	-	51 per cent

The proportion of persons of college age (18-21) who are enrolled in college has also risen:

1899	-	4 per cent
1949	-	19 per cent

There has also been a shift in emphasis from academic to vocational education. In 1910, the proportion of students studying home economics was 3.8 per cent; of those studying agriculture, 4.7 per cent. By 1949 these ratios had increased to 6.7 per cent and 24.2 per cent respectively. The proportion of students enrolled in industrial courses in 1949 was

26.6 per cent, compared to 11.2 per cent in 1915. The proportion of students studying commercial subjects in high school, however, fell from 12.6 per cent in 1922 to 8.7 per cent in 1949. This may be due in some part to the mechanization of office work and the shift in skills needed. Thus, for example, the enrollment in typing courses has risen from 13.1 per cent in 1922 to 22.5 per cent in 1949, while the enrollment in shorthand courses has fallen.

Another measure of this shift in emphasis is the following: in 1917, only eight states provided for vocational education; in 1937, all 48 states made these provisions. Furthermore, there is increased variety of programs. Schools and industries have worked together in cooperative training programs. Schools have established apprenticeship programs, part-time and adult continuation courses, and vocational guidance programs.

However, although public education has been compulsory for both male and female, there is still a wage differential based on sex.

Effects of Education: Broad general education for all has produced a labor force of great adaptability. Only a few highly skilled jobs need long periods of specialized training. The unskilled get about the same education as the skilled and have similar aspirations for a high standard of living. This is the fundamental explanation for the narrowing wage ratio.

2. Immigration. Before World War I, the supply of immigrants from the southern and eastern parts of Europe provided abundant supplies of uneducated labor, thereby tending to widen the differential between skilled and unskilled workers. The immigration laws subsequently reduced the inflow of unskilled workers considerably.

3. The Negro Labor Force. Just as there were discriminatory wage differentials against the immigrant laborers in the early part of the century, so there has been wage discrimination against the Negro workers who moved into industry in the 1920's and 1930's. The great demand for and reduced supply of unskilled labor has tended to produce equality in wages (for the same work), at least on the local level. Industrial unions admitted Negro members in order to prevent wage cutting and are assumed to treat all workers equally without regard to color.

4. The Role of Organized Labor. Craft unions generally try to maintain or widen the skill differentials, whereas industrial unions may be expected to narrow them. The cost-of-living provisions which generate uniform absolute increases tend to narrow relative differentials. Organized labor has been a chief supporter of public education, so that it has indirectly helped to reduce skill differentials.

5. The Role of Industry. The role of industry in maintaining differentials has not been so great as is usually thought. Intraplant and industry training programs, support of higher education by industry (scholarship funds, cooperative training schemes) have helped to create a highly mobile and adaptable labor force which in turn has helped to reduce skill differentials.

6. The Role of the Public Authorities. There has been no specific public policy, but the by-products of numerous policies have worked toward reducing wage differentials. The Walsh-Healey Act has helped to reduce differentials by requiring that all workers on government contracts receive the prevailing wage rate, regardless of differences based on the size of plant or community. (It has also helped to reduce regional and

interindustry differentials.) The minimum wage laws have tended to have a narrowing effect on wage differentials by raising the low wages without affecting the higher wages. Taft-Hartley Law requirements of fair representation of members by unions has helped to eliminate differentials based on socio-ethnic differences. The War Labor Boards generally adhered to the equal work, equal pay doctrine. Furthermore, their rulings on cost-of-living adjustments helped to reduce wage differentials between skilled and unskilled workers.

Robert Ozanne, "A Century of Occupational Differentials in Manufacturing,"
Review of Economics and Statistics, August, 1962.

There were two defects in Ober's study on occupational wage differentials: the lack of continuous data and the absence of data before 1907. The resultant extrapolations are therefore questionable. This study is based on the payroll records of the McCormick Works the Chicago plant of the International Harvester Co., which provided continuous data from 1858-1959.

The Ober-Kanninen data on manufacturing showed a long-run decline in the ratio of wages of skilled to common labor rates:

1907	207
1915-19	175
1931-32	180
1937-40	165
1945-47	155
1952-53	137

This decline has often been explained by the underdeveloped country hypothesis: in the early states of industrialization, common labor is plentiful while skilled labor is rare. As industrialization and education proceed, the supply of skilled labor becomes more plentiful relative to unskilled labor. Hence the premium paid for skilled workers is reduced.

Ozanne challenges this hypothesis and the notion that differentials have decline over the long run. A chart of the McCormick data shows graphically that there has been no long-run decline. The large differential in 1907 in the Ober data appears here to be only one peak in a recurring series of rising and falling differentials rather than evidence of higher differentials in the past. Other data for the 19th century also indicate that the United States did not experience the wide

differentials attributed to underdeveloped countries.

Occupational Wage Differentials in Manufacturing
Based on Data from Three Government Wage Surveys

Ratio of skilled to common labor wages

Year	I U.S. Dept. of Labor Western Cities	II Bulletin 18 Eastern Cities	III Aldrich Report	IV Weeks Report
1860	169	157
1865	168	169
1870	161	154	176	172
1875	160	157	179	172
1880	174	181	173	171
1885	172	161	170	...
1890	169	168	170	...

Several special characteristics of the American experience, which do not apply to the developing countries today, raise some doubt that it can be regarded as a typical case: (a) The U.S. had more time to train workers, industrialization in the last century being slower paced than it is for the countries industrializing now. (b) The abundance of cheap land on the American continent provided alternative uses for common labor so that there was never a surplus as in Europe in the past and the underdeveloped countries today. (c) Before 1890, immigration into the U.S. came from the more advanced countries of northern Europe, and there may have actually been a surplus of skilled labor.

Effects of Immigration. There have been attempts to explain the narrowing of differentials after 1907 by the cessation of immigration and the resulting decrease in the supply of unskilled labor. But there has been no shortage of common labor: rural-urban migration increased

the supply and the substitution of machinery for unskilled labor lowered the demand. The McCormick data, in fact, show a widening of differentials from 1921-26. They also show a contraction in 1936-37, despite a substantial surplus of common labor in that year.

Wartime Inflation. It is almost axiomatic that differentials narrow in inflations, although the underlying theory is not clear. In the McCormick plant, there was an initial narrowing in both the Civil War and World War I, but on the other hand, a significant widening occurred in World War II. The automobile and steel wage chronologies (HLS) indicate the same phenomenon.

Cyclical Movements. The McCormick data also call into question the currently accepted pattern of cyclical variation in differentials: they show expansion in periods of prosperity and contraction in recessions, the reverse of the expected pattern. An explanation could be that at the start of an upturn in activity, there is a surplus of unskilled workers and a shortage of skilled, since training programs usually decline during a recession; this would account for the widening during the expansion phase. In recessions, on the other hand, employers are reluctant to cut the wages of the lowest-paid workers, already near the subsistence level.

The McCormick pattern was not completely consistent, as the following tabulation indicates.

<u>Periods of Prosperity</u>	<u>Change in Diff.</u>	<u>Periods of Recession</u>	<u>Change in Diff.</u>
1870-1873	narrowed (mostly in 1871)	1858	narrowed
1879-1882	widened	1873-1879	narrowed
1900-1907	widened	1893-1899	narrowed
1921-1929	widened	1921-1922	no change
1949-1957	no trend	1929-1933	no change

Effects of Unionization. Unions can have substantial effects on wage differentials but these vary with the type of union. In the McCormick plant, the craft unions, when they were dominant, generally tended to widen differentials whereas the industrial union tended to narrow them.

Conclusions. The periodic rises and falls in the McCormick differentials are only partly explained by traditional labor market analysis. During most of the period studied, there were ample supplies of skilled and unskilled labor. Under these conditions, occupational wage relationships were more influenced by internal plant pressures, unions, workers' notions of equity, rational job evaluation schemes.

Because the data cover only one plant, they should be utilized to question existing theory rather than for drawing firm conclusion. However, because the plant is a large one, and at the hub of the national transportation system, its experience is suggestive.

E. M. Caselli, "Wage Differentials, By Skill, 1920-1948," Management Record, August, 1949.

The data used in this study were compiled by the National Industrial Conference Board in its monthly payroll statistics series. (See Management Record, May 1949, for data on men's and women's wages in 25 manufacturing industries from 1920-1948.)

Results

The unskilled wage rate increased by 132 per cent over this twenty-eight year period while the skilled rate increased by 128 per cent. Throughout this period the unskilled-skilled wage ratio averaged about 75 per cent with a range of 70.7 per cent to 78.3 per cent.

A comparison of weekly earnings showed substantially the same result. During wartime, skilled weekly earnings rose sharply in contrast to the modest gains registered by unskilled workers. This was a result of an uneven distribution of overtime and incentive wage plans.

An analysis of the effects of the War

The war period saw a large increase in the size of the semiskilled group relative to the skilled and unskilled groups. The percentage of unskilled workers among men had been declining from 1922, when it was 29 per cent to 1945, when it fell to 18 per cent. This trend was due to technological advances eliminating unskilled jobs, but also to the drafting of nonessential workers during the war and their replacement by women. The number of highly skilled jobs contracted during the war because of changes in the production process which enabled semiskilled

TABLE 1

Wage Rates Per Hour Paid to Unskilled and
Skilled Male Workers, 1920-1948

Year	Skilled	Unskilled
1920	\$.687	\$.529
1933	.550	.401
1948	1.567	1.227

workers to perform the necessary work. The net result of these two changes was thus to increase the size of the semiskilled group. None of the essential war industries showed a relative expansion of unskilled workers. On the other hand, the soft goods manufacturing industries reported sharp increases in the relative numbers of common and unskilled labor, reflecting the flow of skilled labor to the vital war industries. After V-J day, the interindustry shifts reversed somewhat, with the unskilled workers returning almost to their prewar proportions of the labor force. In January 1939 the proportion of unskilled production workers in manufacturing industries was 18.6 per cent; in July 1944, 17.8 per cent; in September 1945, 17.7 per cent; July 1948, 16.1 per cent.

Paul G. Keat, "Long Run Changes in the Occupational Wage Structure 1900-1956," Journal of Political Economy, December, 1960.

Analysis of a composite sample of 141 occupations in 17 industries -- from data from the Bureau of Labor Statistics, the Interstate Commerce Commission, and the National Industrial Conference Board -- confirms the findings of other studies that relative skill differentials have been narrowing. The building and printing trades and railroad occupations account for the major part of the sample. Two dates were chosen for comparison: 1903 and 1956 because of their comparability in terms of cyclical phases (peak years). Where data for these specific years were not available, information for 1907, 1910, 1913, 1915, and 1945-1956 was considered acceptable and adjusted to the appropriate year. Let t_1 and t_2 be the date for the early and later periods respectively. Let I be the average hourly earnings for all manufacturing industries. Let W be the occupational wage rate. Then compute W/I for t_1 and t_2 for each occupation. Then estimate the 1903 and 1956 values for each occupation by the following formulas:

$$\log (W/I)_{1903} = \log (W/I)_{t_1} - (t_1 - 1903 / t_2 - t_1) \times \frac{\log (W/I)_{t_2}}{(W/I)_{t_1}}$$

$$\log (W/I)_{1956} = \log (W/I)_{t_2} + (1956 - t_2 / t_2 - t_1) \times \frac{\log (W/I)_{t_2}}{(W/I)_{t_1}}$$

Results

1. There was little change in the rankings between 1903 and 1956.

$r_T = .809$. However, giving equal weight to all occupations, the coefficient

of variation (c.v.) for W/I was .496 in 1903 and .326 in 1956, indicating a narrowing in the differentials. Weighting the occupations according to quantitative importance, the following c.v. were obtained:

	<u>1903</u>	<u>1956</u>	<u>Percentage Change</u>
1903, 1956 weights for their respective years	.515	.234	-54.6
1903 weights for both years	.515	.341	-33.8
1956 weights for both years	.369	.234	-36.6

Although the magnitudes vary, the three methods indicate consistent direction of change.

2. In order to avoid possible distortion because of the large number of observations in the predominantly high-paid union building trade and railroad occupations, an additional computation was run excluding them. There were some differences in the magnitude of change, but they were consistently in the same direction.

3. The data were analyzed by region: again, considerable contraction of the wage structure occurred except in the South, for which the sample was very small.

4. A rough test was made for each of the industries in the original sample which included at least five occupations. Substantial narrowing occurred in all but two industries, with the coefficients of variation declining from 27 to as much as 77.5 per cent.

5. Three other tests were made: (a) NICB data for 20 industries showed a decline in the coefficient of variation of 23 per cent from 1914 to 1948. (b) Data for production workers in 44 industries were analyzed, with an attempt made to eliminate the influence of varying proportions of

women in the sample. In all cases, the c.v. were greater when women were included in the sample, but nevertheless, they showed a consistent decline: of 42 per cent in the unweighted coefficient for males and females combined, 40 per cent of males alone. In the weighted coefficients the declines were 26 to 25.5 per cent respectively. (c) The last test showed a pronounced narrowing of differences between academic salaries and average annual earnings in manufacturing:

Ratios of Salaries in Selected Academic Occupations
to Average Wages in Manufacturing (per cent)

<u>Occupation</u>	<u>1904</u>	<u>1953</u>
University presidents	776	407
Professors	361	173
Associate professors	271	138
Assistant professors	235	114
Instructors	144	91
High school principals (in cities over 500,000)	641	226
High school teachers (in cities over 500,000)	288	136
Elementary school teachers (in cities over 500,000)	158	119

Causes. Why have occupational differentials narrowed? Possible influences are examined: differences in the age, sex, racial composition of the labor force over time; unionization; immigration; education.

Changes in the age of the working force appeared to have had no effect on differentials because the median age of the groups classified by skill increased in about the same proportions.

The data already indicated that sex did not have a substantial effect on coefficients of variation. An estimate of what the decline in discrimination against Negroes might amount to, indicated that even if the proportion of Negroes' to whites' wages had risen from 25 per cent to

75 per cent from 1910 to 1950, the total effect on differentials would be a decline of only 5 per cent.

Unions could have two effects on wage differentials: through a change in the intraindustry wage structure, or through their effect on interindustry differentials. A ranking of industries by coefficients of variation and degree of union organization showed little correlation. There also seemed to be little relation between changes in the degree of unionization over the 53-year period and the narrowing of the differentials between industries: when the 17 industries in the original sample were separated into four groups according to the change in unionization, only one group -- industries less than 60 per cent organized in 1903, and over 80 per cent organized in 1956 -- increased its average wage significantly relative to the entire sample. The increase was 8 per cent in the unweighted and 6 per cent in the weighted average.

Although it is likely that the practical cessation of immigration led to some decline in the occupational differentials -- since the supply of unskilled workers was affected more than the supply of skilled -- it is difficult to measure this factor.

Increased education and training over the period studied were considered to have had a substantial effect on the narrowing of skill differentials. Some evidence was found in the relatively higher wages paid apprentices and the shorter training periods found necessary in the 1950's than in the early years. Lower costs of training skilled workers, attributable to their increased years of schooling before training, could explain a large part of the change in the skilled-unskilled differential.

K. J. Arrow and W. M. Capron, "Dynamic Shortages and Price Rises: The Engineer-Scientist Case," Quarterly Journal of Economics, May, 1959.

Arrow and Capron emphasize two points: (a) the shortage of engineers and scientific personnel has been exaggerated, partly because there has been no clear and consistent definition of the term "shortage"; (b) what shortages there have been do not reflect imperfections in the market mechanism. On the contrary, they are what a dynamic interpretation of classical supply and demand theory would suggest.

The Dynamic Interpretation of the Supply and Demand Mechanism.

Supply and demand are equal only as the end result of a process of adjustment, during which time supply does not equal demand. When supply is less than demand, prices will rise until the two are made equal. Now if we can assume that the two schedules are stable, supply can remain less than demand only temporarily and the shortage will disappear as price approaches its equilibrium value. But, if the demand curve is steadily shifting upward, the shortage will continue to persist and the price will continue to rise without reaching its equilibrium value. The market for engineers and scientists since 1950 appears to have been one in which the demand curve was not stable and, therefore, the shortages are expected to be persistent.

A Model of Dynamic Shortages and Price Rises. While the market is in disequilibrium, there are many prices being paid for the same kind of services. However, the average price will rise as long as demand exceeds supply at a given price. Although the average price will rise, it will not rise instantaneously because of the following lags:

1. It takes time for an individual firm to recognize that shortages

(unfilled jobs) will continue to exist unless it pays a higher price to attract the needed supply.

2. Once a decision is made to offer a higher price, it takes time to get the decision approved within the administrative hierarchy.

3. It takes time to calculate how many people will be demanded at the higher price.

4. It takes time to finally issue the orders to hire more people.

5. Even after the firm hires new workers, the industry will not yet be in equilibrium because the workers already in the firm are still being paid at the lower price. If the firm immediately raises their salaries, the lag in the industry's adjustment will be decreased. If the firm recognizes, however, that it will have to raise the wages of all its engineers and scientists performing the same work as the newly hired ones, it may be less ready to bid up the price it is willing to offer to attract new personnel; this delays the time when the market will reach equilibrium. If, on the other hand, the firm does not raise the wages of its existing employees -- for example, there may be a long-term contract -- there will be a lag before these employees are aware of the demand conditions in the market and force up their price by threatening to work for another firm seeking to increase its staff.

The rate at which the average price will rise per unit of time towards its equilibrium value will depend upon the excess of demand over supply. It will be greater as the excess of demand is greater, and will cease to rise when demand equals supply. Or, expressed in terms of the shortage, there will be a chronic shortage as long as demand continues to rise and the magnitude of the shortage will depend upon the rate of increase

in demand, the reaction speed in the market (defined as $\frac{dp/dt}{D-S}$, where dp/dt is the rate of price change per unit of time, and $D-S$ is the shortage), and the elasticity of supply and demand. The factors affecting the reaction speed were described above.

Were There Dynamic Shortages in the Engineer-Scientist Market? The available empirical evidence, despite all the talk about shortages, is quite meagre. In 1953 the National Science Foundation asked officials of large companies if they were experiencing a shortage of engineers and scientists for research and development purposes. However, no operational definition of shortages was used. If we can assume that the respondents would understand shortage to mean unfilled vacancies at the salaries being paid current employees, then at least one-half the firms reported they were unable to hire enough people to meet their needs. However, only in one industry, aircraft, did all the firms report such a shortage. A study of the chemical industry by G. W. Beste also showed that some firms had vacancies at current salary levels.

What reasons would lead one to suspect that the shortages in the engineer-scientist market were dynamic shortages and not market imperfections?

1. Demand. It is common knowledge that demand increased very rapidly. In 1951 there was an increase of 23.7 per cent in the total number of research and development engineers and scientists. This increase was due chiefly to the rise in government contracts because 15,547 out of the increase of 17,557 that year were under government contract. Since there is also some indication that military work is more complicated than industrial work, the pressure of demand on supply would be even greater.

2. Elasticity of supply of engineers and scientists is expected to be low in the short run because of the time needed for training. Over the long run, although price undoubtedly has some influence, non-pecuniary factors may also be important enough to keep the supply low.

3. The reaction speed in this market can be expected to be slow, at least slower than in commodity markets, because of the prevalence of long-term contracts, desire for job security (of which academic tenure is an extreme form), the heterogeneity of the market which slows down the diffusion of information, and because of the dominance of a few firms which prevents smaller firms from outbidding larger firms or appreciably affecting the distribution of personnel. Hence, the existence of no-raiding agreements.

Alternate Definitions of Shortage. Blank and Stigler defined a shortage as existing if the relative price of engineers had risen. They found, however, that since 1929 the earnings of engineers had fallen relative to earnings of all wage earners and also relative to other professions. Hence, they concluded that there was no long-run shortage of engineers. Nevertheless, they did find that after the outbreak of the Korean War, there was a minor increase in the relative wages of engineers. Because Blank and Stigler were concerned with long-term supply, they did not consider this increase important. However, it may be significant in view of the fact that the complaints about shortages did not begin until after the Korean War. Furthermore, even though the market may operate in the long run, the possibility of dynamic shortages in the short run is not precluded.

There may be complaints about shortages because of the loose use of

that term. For example, some people seem to mean that there are not enough engineers and scientists to do all the things that need to be done to maintain rapid technological progress, military security, etc. That is, these people are really saying there is not enough demand. Others talk about shortages in the sense that we are not turning out as many engineers and scientists as the Soviet Union. There is still another possibility: some employers who assert that a shortage exists are not in fact willing or able to pay the higher price to prevent workers from going to more lucrative employment opportunities.

Conclusion. Shortages were felt in the engineer-scientist market because demand rose very rapidly and certain lags prevented the price from rising fast enough to reach equilibrium. While the relative rigidity of the supply function in the short run is unpleasant and the price rise needed to restore equilibrium may seem to be very large, it is only by permitting the market to react to the rising demand that it can allocate the supply of engineers and scientists in the short run and call forth the desired supply in the long run.

Toivo Kanninen, "Occupational Wage Relationships in Manufacturing, 1952-53,"
Monthly Labor Review, November, 1953.

Percentage differences in pay between skilled and unskilled jobs in manufacturing have narrowed over a long period of years. Recently, however, the tendency has been to maintain or increase differentials. Approximately one-third of wage settlements after the end of wage stabilization in February 1953 at least maintained differentials.

Recent interest in data on wage differentials has led to the considerable expansion of data collection and analysis. The method of analysis adopted in this study is as follows: In each establishment hourly earnings of janitors were used as a base (100) and earnings of other workers calculated as a percentage of that base. The basis of industry or area comparisons was the appropriate mean or median, and a measure of dispersion is provided by defining a "middle range" within which one-half of the establishments fell.

Although there was considerable variation in detail, several trends are notable. Machinists, stationary engineers, and electricians generally averaged somewhat more than other skilled trades. The majority of city medians for these jobs fell between 135-144. Medians for carpenters, mechanics, millwrights, pipefitters, and sheetmetal workers tended to group between 130 and 139, and most painter medians were concentrated in the 127-131 range.

Among the 31 job categories analyzed, those requiring only a short training period showed the least variation on an intracity as well as intercity basis.

Regional Differences in Wage Relationships. There were few

clearcut regional patterns, but several observations can be made. Average wages in maintenance work in manufacturing plants in southern cities compared favorably with prevailing levels in other cities, but unskilled labor rates were substantially lower in the South. For example, the differentials between electricians and janitors was much greater in the South although the regional variation in electricians' wages was not great. Regional differences in wage structure account in part for the dispersion noted when city medians are arrayed.

There was no observable regional pattern in the distribution of the highest differentials. Highest city medians for machinists, mechanics, and painters were found in Atlanta; for engineers and sheetmetal workers in New York; while for tool and die makers the highest city medians were in Providence and St. Louis. In percentage terms, occupational wage differentials tended to be narrowest in Providence, Cleveland, and Buffalo, and they were relatively narrow for certain skilled jobs in other areas. The only matching of regional ranges of city medians that did not show an overlap is that between the South and the Far West.

Intracity Variation in Wage Relationships. Differences in wages for the same job were generally greater among manufacturing establishments located in the same city than among the medians of different cities. The highest degree of uniformity in wage differentials occurred in large West Coast cities and the lowest degree occurred in the South.

Size of establishment, as measured by total employment, did not appear to be a significant factor in the spread of differentials between skilled and unskilled jobs in a city.

Interindustry Variation in Wage Relationships. Since particular

areas are often centers for particular industries, the regional pattern of occupational differentials is influenced by interindustry differentials. Differences in industry median wage relationships were found to be substantially greater than area differences. For six skilled maintenance and power plant jobs, the highest median exceeded the lowest by more than 40 percentage points in all but the case of engineers. Thus the range of industry medians for each occupation was greater than the range of area medians.

	<u>Range of industry medians</u>		
	<u>Low</u>	<u>High</u>	<u>Point-spread</u>
Carpenters	127	171	44
Electricians	128	189	61
Engineers, stationary	129	160	31
Machinists	127	179	52
Mechanics	124	198	74
Painters	120	170	50

The occupational medians were particularly high in newspapers and malt liquors, but in other industries the occupational median rarely exceeded 150 per cent of the janitor's wages.

A high proportion of the establishments studied were unionized. Where an employer negotiates with several unions, each of which bargains for a segment of the plant work force, the pattern of occupational wage relationships may well differ from situations in which wage structure is initially determined, and adjusted, as a single unit.

There were some examples of substantial interplant differentials,

particularly in malt liquors, newspapers, and drugs and medicines. However, many more industries showed relatively slight interplant differentials, with the point spread of the middle range of the distribution often within 5 to 9 percentage points. These included the large-plant industries (aircraft, steel, meatpacking) which typically have formalized rate structures.

The development of new occupations, particularly semiskilled, that follows the introduction of mass production techniques has led to increasing complication in the wage structure as well as the narrowing of relative differentials. The ranges of wages for occupational grades overlap to an increasing degree. In addition, the steps within each occupational category tend to be of the same absolute size, say five cents per hour. Therefore, there are smaller relative increases for occupations at the top of the pay scale.

Toiva P. Kanninen, "Job Pay Differentials in Machinery Plants," Monthly Labor Review, April, 1954.

This study of wage relationships in a single, important industry group, nonelectrical machinery manufacturing, is based on a survey conducted by the Bureau of Labor Statistics during the winter of 1952-53. For purposes of analysis, average hourly earnings for male janitors paid on a time basis were used as a base (100); wages for workers in other jobs were converted to a percentage of the base.

Percentage differentials in pay between skilled and unskilled jobs in the industry have narrowed substantially in the postwar period (to 1953). This occurred largely as a result of applying uniform cents-per-hour increases.

Median percentages for incentive workers exceeded those for time workers in each job compared. However, incentive pay plans were used in only a minority of the establishments surveyed. Women received lower pay than men for those jobs in which they were jointly employed. Among the factors that may influence this difference are length of service or experience, as well as minor differences in specific duties performed.

Comparison of all regions, except the South, indicated great similarity in wage structures, both in the percentage spread between pay levels of skilled and unskilled jobs and the rank order of pay position. Unskilled wage rates in the South compare less favorably with those in other regions than do skilled wage rates. Thus, the greater relative differentials in the South are accounted for by this factor. Some of the highly skilled Southern workers earned as much or more than many of their counterparts in other regions. On the other hand, the region with the

narrowest differentials between skills was the Far West. All of the data are presented in Table 1 below.

TABLE 1

Occupational Average Hourly Earnings as Percentages¹ of Averages for Men Janitors in Machinery Manufacturing, by Region² and Method of Wage Payment, Winter 1952-53

Median establishment percentages in-

Occupation, grade, and sex	All Regions						New England						Middle Atlantic						Middle West						Far West ³			
	Incen-			Time			Incen-			Time			Incen-			Time			Incen-			Time			Incen-		Time	
	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers			
Men																												
Assemblers, class A	135	152	139	136	155	134	145	132	145	155	134	145	132	145	155	134	145	132	145	155	134	145	132	145	155			
Assemblers, class B	121	139	123	123	142	121	135	118	130	139	121	135	118	130	139	121	135	118	130	139	121	135	118	130	139			
Assemblers, class C	109	127 ⁴	110	107	131 ⁴	109	124 ⁴	111	113	131 ⁴	109	124 ⁴	111	113	131 ⁴	109	124 ⁴	111	113	131 ⁴	109	124 ⁴	111	113	131 ⁴			
Electricians, maintenance	140	---	141	139	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Inspectors, class A	139	---	141	142	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Inspectors, class B	123	144	122	125	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Inspectors, class C	111	130	109	111	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Laborers, material handling	104	115	106	103	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Machine-tool operators, production, class A	139	154	139	137 ⁴	159	139	155 ⁴	131	149	151	139	151	139	151	139	151	139	151	139	151	139	151	139	151	139			
Automatic-lathe operators, class A	138	154	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Drill-press operators, radial, class A	133	148	129	132	151	149	134	151	130	139	147	134	151	130	139	147	134	151	130	139	147	134	151	130	139			
Drill-press operators, single- or multiple-spindle, class A	126	145	135	123	154	123	138	122	130	141	127	138	122	130	141	127	138	122	130	141	127	138	122	130	141			
Engine-lathe operators, class A	141	154	140	139	163	141	159	135	157	146	141	159	135	157	146	141	159	135	157	146	141	159	135	157	146			
Grinding-machine operators, class A	140	157	141	139	160	139	153	136	148	153	139	153	136	148	153	139	153	136	148	153	139	153	136	148	153			
Milling-machine operators, class A	140	153	138	138	166	140	166	140	150	150	140	166	140	150	150	140	166	140	150	150	140	166	140	150	150			
Screw-machine operators, automatic, class A	139	154	139	146	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Turret-lathe operators, hand, class A	137	153	139	137	151	137	151	136	153	150	133	150	133	150	133	150	133	150	133	150	133	150	133	150	133			
Machine-tool operators, production, class B	125	139	124	125	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Automatic-lathe operators, class B	126	150	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Drill-press operators, radial, class B	121	135	121	121	137	121	135	120	125	135	121	135	120	125	135	121	135	120	125	135	121	135	120	125	135			
Drill-press operators, single- or multiple-spindle, class B	116	133	113	112	129	112	129	117	123	133	112	129	117	123	133	112	129	117	123	133	112	129	117	123	133			
Engine-lathe operators, class B	127	137	126	126	146	126	146	128	136	146	126	146	128	136	146	126	146	128	136	146	126	146	128	136	146			
Grinding-machine operators, class B	124	140	123	124	143	124	143	120	139	143	124	143	120	139	143	124	143	120	139	143	124	143	120	139	143			
Milling-machine operators, class B	124	135	123	122	140	122	140	124	135	140	124	135	124	135	140	124	135	124	135	140	124	135	124	135	140			
Screw-machine operators, automatic, class B	125	137	121	128	132	128	132	125	147	147	125	147	125	147	147	125	147	125	147	147	125	147	125	147	147			
Turret-lathe operators, hand, class B	125	138	126	125	144	125	139	124	134	139	124	134	124	134	139	124	134	124	134	139	124	134	124	134	139			

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TABLE 1. (cont.)

Median establishment percentages in-

Occupation, grade, and sex	Median establishment percentages in-										Par	
	All Regions	New England	Middle Atlantic	Middle West	South	West	Incen-	Time	workers	Time	Incen-	Time
	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time
	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers	workers
	112	110	111	112	115	111	112	115	115	111	115	111
	115	107	107	107	107	107	107	107	107	107	107	107
	111	105	105	105	105	105	105	105	105	105	105	105
	107	105	105	105	105	105	105	105	105	105	105	105
	115	107	107	107	107	107	107	107	107	107	107	107
	112	109	109	109	109	109	109	109	109	109	109	109
	112	110	110	110	110	110	110	110	110	110	110	110
	114	109	109	109	109	109	109	109	109	109	109	109
	139	137	137	137	137	137	137	137	137	137	137	137
	146	148	148	148	148	148	148	148	148	148	148	148
	163	169	169	169	169	169	169	169	169	169	169	169
	152	152	152	152	152	152	152	152	152	152	152	152
	139	139	139	139	139	139	139	139	139	139	139	139
	127	145	145	145	145	145	145	145	145	145	145	145
	109	125	125	125	125	125	125	125	125	125	125	125
	98	117	117	117	117	117	117	117	117	117	117	117
	116	116	116	116	116	116	116	116	116	116	116	116
	102	119	119	119	119	119	119	119	119	119	119	119
	117	121	121	121	121	121	121	121	121	121	121	121
	104	120	120	120	120	120	120	120	120	120	120	120

/notes continue next page/

Notes to Table 1

1. These percentages show the relationship between straight-time average hourly earnings (excluding premium pay for overtime and nightwork) for selected plant occupations in machinery plants. In each establishment covered the average hourly earnings for time-rated men janitors were used as a base (100); average hourly earnings for time workers (hourly rated or salaried) and incentive workers (piecework or production bonus) in other occupations were converted to a percentage of that base.

2. Labor markets studied have been grouped for this analysis as follows: New England--Boston, Hartford, Providence, Worcester; Middle Atlantic--Buffalo, Newark-Jersey City, New York, Philadelphia, Pittsburgh; South--Atlanta, Baltimore, Chattanooga, Dallas, Houston, Tulsa; Middle West--Chicago, Cincinnati, Cleveland, Detroit, Indianapolis, Kansas City, Milwaukee, Minneapolis-St. Paul, St. Louis; Far West--Denver, Los Angeles, Portland, San Francisco-Oakland, and Seattle.

3. Number of establishments with incentive plans too small to justify comparisons for other than time workers.

4. Number of establishments employing workers in the occupational category (and in the janitor category) too small to justify comparisons.

Kenneth M. McCaffee, "The Earnings Differential Between White Collar and Manual Occupations," Review of Economics and Statistics, February 1953.

In 1939, average white collar¹ earnings were 38 per cent greater than average income in the manual occupations² (\$1,444 and \$830 respectively). Data for earlier periods, although not so complete, show that the differential has been declining for 50 years. The trend is probably attributable to the increased employment of women in white collar work relative to other occupations, and to the great number of high school graduates seeking white collar jobs.

Does the 38 per cent excess represent a "real" difference in wages, necessitated by the extra skill involved? Or is it a "compensating" difference (equalizing the advantages and disadvantages of the occupations)?

Relative Importance of Earnings Determinants. The relevant determinants of differentials are of two types, positive and negative: positive factors which tend to make the differential larger -- income in kind, length of employment, education, location, racial composition; and negative factors -- sex and age composition of the two groups, unionism, etc.

1. Adjustments to the basic Census data were required to make the income figures comparable. Workers with no income, unpaid family workers, and income in kind were the major technical problems here. The total effect of these adjustments was to reduce the differential from 38 to 32 per cent. (Corrected manual income of \$891 was then taken as a base for future computations of adjustments.)

-
1. Clerical, sales and kindred workers in the Census classification.
 2. All other occupations, except agricultural, professional and semi-professional, and proprietors, managers and officials.

2. White collar workers were employed longer hours (but probably enjoyed more coffee breaks) and more weeks per year, than manual. The differential for only those workers who worked 12 months was 28 per cent, 10 percentage points less than the differential for all workers.

3. The typical white collar worker had obtained three to four more years of schooling than the manual worker in 1940. No substantial extra costs were involved except the postponement of income from employment. Estimating a "riskless" interest rate at 3-4 per cent (the rate of long term U. S. Treasury bonds and the average life insurance earning rate), annual average white collar income would need to exceed manual income by 9-12 per cent to compensate for the postponement of employment.

4. Estimates of the effect of the size-of-city factor, using Census and other data, were put at 4 to 6 per cent of manual income because the proportion of white collar workers in cities over 25,000 was higher than manual.

5. Average white collar income for white workers was estimated at \$1,180; for non-white, \$472. The comparable figures for manual workers were \$963 and \$407. The different proportions of nonwhites in the two occupational groups thus explained between 7 and 10 percentage points of the earnings differential.

6. The larger proportion of women in white collar occupations and the substantially larger average earnings for men in both white collar and manual occupations combine to lower average earnings of all white collar workers. Had there been no difference in sex composition of both groups, the differential would have been almost one third larger (about 12 per cent

of manual income).

7. White collar workers are concentrated more in the younger age group. The difference in age distribution probably lowered the differential by 2 to 5 per cent of manual earnings.

8. Unionism probably increased manual incomes slightly over white collar: at the most about 4 to 5 per cent of the manual average. Miscellaneous factors such as fringe benefits, taxes, etc., were of little account in 1939.

Results. The combination of factors above accounts for 64-88 per cent of the size of the differentials observed. What other factors might be responsible for the unaccounted portion?

1. Statistical errors. A multiple correlation might raise the explained variance, but tests on pairs of variables showed little correlation between them, except for age and sex.

2. Nonpecuniary advantages. This is not likely to be a factor since white collar jobs generally are more attractive and have more status, so the differential would not be needed.

3. Variability of income. The chance of obtaining very high incomes in either occupation is about equally small, so that the differential is not likely to be accounted for by this factor.

4. The groups may be noncompetitive. That is, differentials in earnings may be greater than necessary to compensate white collar workers.

5.(a) Are there any differences in the innate productivity of those who choose white collar jobs? There is no way to measure this factor. (b) The supply of white collar workers relative to the demand for them may have been low. Training and education have been generally regarded as consumption

rather than investment so that the proper calculation was not made by those who might have considered acquiring the skills for white collar jobs. Similarly, the lack of a capital market for those who wanted to borrow to continue their education made it difficult even for those who wanted to acquire the skills. This is probably an important factor in explaining the size of the differential between white collar and manual occupations.

R. L. Raimon, "The Indeterminateness of Wages of Semi-skilled Workers,"
Industrial and Labor Relations Review, January, 1953.

Raimon asserts that the concept of "occupation" is irrelevant when applied to semiskilled workers and that persistent wage diversity can be explained only by the nature of the hiring process. Because of this factor, the wages of semiskilled workers tend to show a greater range of differentials than either the wages of skilled or unskilled workers. According to Raimon, technological development has resulted in the creation of a large group of semiskilled workers who are hired on the basis of speed, dexterity and adaptability, rather than on specific occupational training, skill, or experience. These workers are characterized by their ability to shift from occupation to occupation and from industry to industry because the great bulk of their "occupational" training actually comes on the job. Thus when a semiskilled worker loses his job, he also loses his occupation and reverts to a pool of general factory labor. In addition, where firms have integrated wage structures, and rates cannot be raised for jobs where shortages exist without distorting all wage relationships, some kind of internal promotion system is usually developed to enable them to adjust their supply of labor to their demands. Under these circumstances, the intrafirm job market tends to have only limited rather than continuous contact with the external labor market. The points of contact are usually centered on the skilled and unskilled groups where hiring is done on an occupational basis. The semiskilled jobs tend to be filled from within the firm; hence the rates on these jobs are less subject

to competitive pressures, and tend to be less uniform than skilled and unskilled rates.

The Evidence

The cross-industry studies, Tables 1 and 2, show that wage dispersion is generally greater for the semiskilled groups than for the skilled or unskilled. A similar test was also made on occupational groups within one industry, the machinery industry; table 3 shows again that wage diversity is greatest for semiskilled workers.

Although the evidence is consistent with the hypothesis, there may be other factors which account for these relationships:

1. Incentive wages. Differences in formulas for incentive pay may easily yield large and persistent wage differentials and since incentive schemes are more prevalent among semiskilled workers than skilled and unskilled, this may be a vital factor. However, since Tables 1 and 2 were constructed from wages paid on a time basis, the conclusion still stands.
2. Wage discrimination. Differentials may be due to differences in the proportions of women or Negroes employed in the various occupational groups. The data in Tables 1 and 2 were computed by sex and the results were not affected by this factor. Furthermore, racial factors would not seem to have any importance since most Negroes' jobs are in the unskilled category.
3. Labor turnover and wage progression. Where rate ranges exist for jobs, firms or occupations with low turnover are likely to have more workers near the top of the range at any point in time than firms with

TABLE 1

Dispersion of Straight Time Hourly Earnings Among Skilled, Semiskilled, and Unskilled Occupations in Manufacturing, Public Utilities, Trade, Finance, and Services for Ten Cities, 1951.

Index of dispersion = interquartile range/median x 100

Occupation	Index
Skilled	10.1
Semiskilled	22.3
Unskilled	21.9

TABLE 2

Dispersion of Straight Time Hourly Earnings for Skilled, Semiskilled, and Unskilled Occupations in Manufacturing and Nonmanufacturing Based on Data for Ten Cities, 1951.

Index of dispersion = interquartile range/ median x 100

Occupation	Index		
	All Industries	Manufacturing	Nonmanufacturing
Skilled	11.1	12.7	14.9
Semiskilled	24.3	24.3	25.5
Unskilled	21.4	18.6	22.8

TABLE 3

Dispersion of Straight Time Hourly Earnings Among Skilled, Semiskilled, and Unskilled Occupations in the Machinery Manufacturing Industry based on Data for Ten Cities in 1951.

Index of dispersion = interquartile range/ median x 100

Occupation	Index
Skilled	10.6
Semiskilled	14.9
Unskilled	10.2

high turnover. Since there are no turnover data, this test cannot be made. However, it is generally noted that turnover rates are high among unskilled workers, yet this group exhibits greater wage uniformity than the semiskilled group.

4. Collective bargaining. Rank correlations for degree of unionization and degree of wage uniformity in all industries are zero for skilled and unskilled workers but $+0.5$ for semiskilled workers. This result is compatible with the hiring pattern hypothesis: employers of semiskilled labor are free to pay any rate within a broad range. For other groups, employers must face competition from other employers. The same test was carried out for the machinery industry with similar results: the rank correlation coefficient was -0.1 for skilled and $+0.2$ for unskilled whereas the coefficient was $+0.7$ for semiskilled.

M. Rothbaum and H. G. Ross, "Two Views on Wage Differences: Intraoccupational Wage Diversity," Industrial and Labor Relations Review, April 1954.

Rothbaum and Ross challenge the hypothesis put forth by Raimon¹ that wage diversity is greater among semiskilled occupations than skilled and unskilled. Wage diversity may arise from two sources: differences in the level of wages among firms and the firms ability to manipulate certain skill groups more than others. Raimon considers only this latter source. Greater dispersion is more likely when jobs are broadly defined than when narrowly defined, and the jobs selected in Raimon's study do not all have the same degree of definability; hence, the differences in wage diversity reflect this factor. Rothbaum and Ross suggest that well defined "key jobs" should be selected, even if they are numerically less important than the ill defined semiskilled jobs. They accept the length of training as a practical guide to the various skill levels but suggest an alternative scheme as being more appropriate.

	<u>Raimon</u>	<u>Rothbaum and Ross</u>
unskilled	a few hours	a few hours to one week
semiskilled	a few days to a few weeks	one month to one and a half years
skilled	two to four years apprenticeship	more than one and a half years

According to the authors, Raimon's scheme excluded from the semiskilled group a large part of the non-repetitive machine operations and a large part of office occupations.

The Evidence: (a) Cross-industry evidence. Using the same source of data that Raimon used (Bureau of Labor Statistics Community Wage Surveys) but with a different occupational sample, Rothbaum and Ross show that there is no significant difference between the wage diversity of the skilled and semiskilled groups. On the other hand, the —————→

unskilled group shows considerably greater dispersion than the other two.

(See Table 1.) Similarly, on a city by city comparison, the unskilled dispersion exceeds that of the skilled in all ten cities and exceeds the semiskilled in nine of the cities. The cities in which the dispersion of skilled workers is greater than that for semiskilled workers were about equal in number to the cities in which the reverse was true. Since all of the skilled and unskilled jobs are occupationally hired, whereas two of three semiskilled jobs are not, the conclusion is that there is no relation between occupational hiring and size of dispersion.

(b) Intraindustry evidence: Again, using the same data on the machinery industry as Raimon did, but with a different occupational classification, Rothbaum and Ross show that semiskilled wages do not have a greater diversity than wages of other groups. (See Table 2.) The standardizing influence of unionization was rejected since similar results were obtained on the cross-industry study and in the office clerical study where unionization was not a major factor. Again, there seemed to be no consistent relationship between occupational hiring and wage diversity.

(c) Office workers evidence: The data (See Table 3) again show no significant differences in the wage diversity of the three groups. However, there is considerable variation within each group. No consistent relationship between hiring patterns and wage dispersion was observed.

Why did the cross-industry data show greater dispersion for unskilled wages than for other groups? Most likely, it was due to the fact that these data included services and trade whereas the evidence from the office and machine industries was limited to manufacturing. Trade and service sectors are characterized.

by large proportions of women and minority groups, high turnover rates, exemption from federal minimum wage laws, and high proportions of new entrants to the labor force. These factors suggest that the unskilled average dispersion in the cross-industry study is essentially a composite of two distinct plateaus which yield a high dispersion when joined.

The occupational hiring concept -- that where genuine markets exist, competition will result in less diversity than where such markets do not exist -- holds true only under the *ceteris paribus* assumption. Rothbaum and Ross conclude that this assumption has not been valid:

1. During periods of prosperity, bottlenecks are likely to occur in the skilled markets, and competition would reduce diversity if counteracting forces were not brought into play. But such counteracting forces do exist and they operate to narrow the interoccupational differentials, which set the maximum limits of intraoccupational diversity. The supply of skilled workers can be increased by promoting semiskilled workers. The competition would therefore be shifted down the occupational ladder as workers are promoted. Competition for semiskilled workers would then operate to narrow wage dispersion on this level. Market pressures are felt most keenly at the lowest skill levels because these are also the lowest income levels. Training programs are stepped up during periods of expansion, and help to relieve the shortage of skilled workers, preventing further widening on this level. Industrial unionism, pattern bargaining, flat cost-of-living adjustments also operate to extend pressures to all skill levels. Hence, it is not surprising to find that wage diversity does not vary greatly among the different skill groups.

2. The long-run decline in interoccupational differentials means that less

and less variation is possible in the wages of semiskilled workers. Furthermore, the use of job evaluation plans and of wage surveys also serves to translate differential supply pressures into uniform wage increases.

3. Lack of full employment, however, reduces competitive pressures among employers to equalize wage rates. Hence, employers are likely to have a great deal more discretion over their rates. Similarly, the decline in union strength would tend to decrease the equalizing pressures from this source. The net result is likely to be greater diversity among the unskilled groups than among the skilled groups. However, this thesis has not been tested empirically.

1. "The Indeterminateness of Wages of Semiskilled Workers," Industrial and Labor Relations Review, January 1953.

Robert L. Raimon, "Hiring Patterns and Occupational Wage Dispersion: A Rejoinder," Industrial and Labor Relations Review, April 1954.

Rothbaum and Ross suggest that I drew erroneous conclusions because the occupations chosen for analysis did not all have the same degree of definability in all skill classes. Their own choices, however, rested on the views of personnel administrators, trade association manuals, and the like. Such groups pursue wage uniformity out of equity considerations: equal pay for equal work. But my article was directed at another issue -- the relation between hiring patterns and occupational wage uniformity. Uniformity is the result of market forces and competition, not equity. Since semiskilled workers do not have a market, we expected little uniformity. The skill classification was not the crucial element. Hence, the sample was selected not on the basis of skill content so much as it was on the likelihood of the job being filled as an occupation. Rothbaum and Ross, by choosing only jobs that are well defined, are by this very process assuming away the problem. They eliminate those jobs whose wages are dispersed, but these are the ones we are trying to explain. Key jobs can be key jobs only because they are the ones for which occupational markets are likely to exist.

The Intra-industry Test (Machinery Industry)

By choosing those occupations whose training periods are at least several months and for which employers would seek specific occupational experience from the applicants, uniformity can be expected because these jobs are nearer our definition of skilled than semiskilled workers. In other words, Rothbaum and Ross have missed the conceptual relation which was being tested: the relation between occupational markets and wage diversity. Even if the statistical tests were

carried out properly, without showing the relationship, the hypothesis itself is not disproved since there may very well have been offsetting factors. To defeat the presumed relationship, it is necessary to challenge the conceptual basis on which it is founded.

The Office-Clerical Test.

This test was not made originally because of the importance of length of service in office wages. That is, two persons in the same job classification may get different wages because of differences in length of service. Since rate ranges are generally greater for office than plant workers, it generally takes longer for office workers to reach their top ranges, and office turnover is higher than plant turnover, there is a wide distribution of lengths of services. This factor is likely to obscure any market forces.

Ceteris Paribus Assumption.

Robthbaum and Ross make the unsupported assumption that in the upswing, shortages of skilled labor are less likely than for other kinds of hourly rated labor. Data from the Bureau of Employment Security suggest the opposite: that the supply of skilled workers remains a more acute problem than the supply of other workers.

Edwin Mansfield, "Wage Differentials in the Cotton Textile Industry,"
Review of Economics and Statistics, February 1955.

This paper describes and analyzes changes in wage differentials in the U. S. cotton textile industry from 1933 to 1952 to test the Dunlop -- Lebergott -- Ober hypothesis (REW, 1939; REW, 1947; MLR, 1948, respectively) that the percentage wage differential between skilled and unskilled workers has narrowed over the last half-century, and that the trend is accentuated in periods of full employment and reversed in depressions.

Table 1 indicates the degree to which the dispersion of wages in the industry has decreased over the period. However, almost all of this decrease occurred during the period of the National Industrial Recovery Act, 1933-34, and the war period, 1941-46. The NIRA textile code, with its minimum wage requirements, and the policies of the War Labor Board, together with the extremely tight market in wartime for unskilled labor, appear to have been important causes of the marked decrease in wage dispersion in 1933-34 and 1941-46.

Table 2 presents data on the coefficient of variation of wages by region and sex. The behavior of these sub-structures is quite similar to the total wage structure. The transition from boom to recession in 1937-38 apparently did not cause the total wage structure to widen, as the Dunlop-Lebergott-Ober thesis would probably have led us to expect, nor were there regional changes. However, it is possible that the time interval was too short to allow the expected adjustment to occur.

Table 3 presents data on the percentage increase in average hourly

TABLE 1
Cotton Textile Industry Hourly Earnings
1933-52

Year	Mean Hourly Earnings (cents)	Coeff. of Variation (%)	Mean	Coeff. of Variation
			(1933 = 100)	
1933	22.5	41.4	100	100
1934	38.4	26.0	171	63
1937	40.9	28.2	182	68
1938	36.9	28.2	164	68
1940	40.3	25.5	179	62
1941	42.8	26.2	190	63
1946	75.0	18.7	333	45
1952	119.0	18.0	529	43

TABLE 2

Relative Dispersion of Cotton Textile Industry Hourly Earnings
By Region and Sex, 1933-52 (coefficient of variation in percentages)

Year	Northern Workers			Southern Workers		
	Total	Male	Female	Total	Male	Female
1933	35.7	35.3	30.1	40.0	38.6	35.4
1934	25.3	26.6	16.9	22.7	25.5	14.1
1937	25.3	27.4	17.0	25.9	26.8	21.5
1938	26.5	n.a.	n.a.	26.2	n.a.	n.a.
1940	25.7	27.3	17.7	20.1	22.1	13.3
1941	33.5	n.a.	n.a.	19.7	n.a.	n.a.
1946	21.8	23.4	16.2	17.7	17.7	13.6
1952	16.1	n.a.	n.a.	16.7	n.e.	n.a.

n.a./not available

TABLE 3

Percentage Increase in Average Hourly Earnings
in Cotton Textile Industry of Low-Paid and High-Paid Occupations
By Region and Sex, 1933-52

Category	1933-34	1934-40	1940-46	1946-52
Males	54	8		
Northern				
Low-Paid	54	9	90	n.a.
High-Paid	40	13	62	n.a.
Southern				
Low-Paid	85	13	102	n.a.
High-Paid	56	4	80	n.a.
U.S.				
Low-Paid	n.a.	n.a.	99	62
High-Paid	n.a.	n.a.	78	52
Females				
Northern				
Low-Paid	66	10	90	n.a.
High-Paid	45	14	80	n.a.
Southern				
Low-Paid	105	12	101	n.a.
High-Paid	73	7	93	n.a.
U.S.				
Low-Paid	n.a.	n.a.	97	60
High-Paid	n.a.	n.a.	84	59

earnings of low-paid and high-paid occupations, by region and sex. Occupational differentials decreased substantially over the period. Again, the greatest changes occurred in the two periods 1933-34 and 1940-46. A less substantial decrease occurred in female differentials.

Table 4 indicates the ratio of Northern to Southern wages in cotton textiles for low- and high-paid occupations and by sex. The regional differential was reduced by three-fourths over the period 1933-50. Again, most of this was accomplished as a result of the policies of the NIRA and the WLB. The minimum-wage provisions of these two agencies raised earnings in the low-wage South by a greater percentage than in the high-wage North.

The following conclusions are drawn:

1. Dispersion of wages decreased substantially between 1933 and 1952 as a result of:
 - a. marked narrowing of wage differentials between workers in different regions and of different sex, and
 - b. decreases in wage differentials between workers of similar region and sex.
2. This decrease was largely accomplished in two periods, 1933-34 and 1940-46, by the policies of the NIRA and WLB.
3. The behavior of wage differentials in the cotton textile industry neither confirms nor refutes the Dunlop-Lebergott-Ober hypothesis. During the war boom, their behavior was in accord with the hypothesis. During 1937-38, there is some evidence against it. The long-term movement of occupational differentials is in the direction observed by Lebergott and Ober.

TABLE 4

Ratio of Northern to Southern Average
Hourly Earnings in the Cotton Textile Industry For
Low-Paid and High-Paid Occupations by Sex, 1933-50

Year	Male		Female	
	Low-Paid	High-Paid	Low-Paid	High-Paid
1933	1.42	1.29	1.44	1.36
1934	1.21	1.17	1.15	1.13
1940	1.21	1.31	1.13	1.20
1946	1.13	1.18	1.06	1.12
1950	1.10	1.06	1.10	1.06

H. M. Douty, "Sources of Occupational Wage and Salary Rate Dispersion Within Labor Markets," Industrial and Labor Relations Review, October, 1961.

The problem is to isolate the relative effects of inter-establishment and intra-establishment factors on the occupational wage structure of a labor market. Occupational wage dispersion is based, to some extent, on differences in workers' efficiency, as reflected in wage incentive systems, personal rates, rate ranges, and hiring standards. This factor has been neglected as a source of wage dispersion.

Methodology. Ten occupations in manufacturing industries in 13 labor markets in 1959 were considered: Women in three important office clerical jobs and men in seven plant occupations, three skilled and four unskilled. These occupations are common, reasonably precisely defined, and typically compensated by time rates. The standard deviation and coefficient of variation were computed for each occupation in each labor market. With data from individual establishments, it was possible to compute the standard deviation of (a) differences in establishment wage levels and (b) differences in rates within the establishment. The sum of the squares of these two quantities would thus be equal to the total variance for each occupation and area.

Results. The amount of dispersion in each occupation and in each labor market varied considerably. The median values suggest that relative dispersion tended to be less for the skilled jobs than for the office jobs, and much less than for unskilled jobs. The extreme values show the highest coefficients of variation to be at least twice the lowest in all but two of the occupations. In the unskilled occupations,

the highest values were at least four times as large as the lowest. The thirteen labor markets were consistent in that those with the lowest coefficient of variation (c.v) for all occupations also had the lowest c.v. for individual occupational groups. That is, the rankings do not change much. The West coast was found to have the lowest occupational wage differentials and the South the highest. The proportion of dispersion due to intrafirm influences was greatest for the office jobs whereas interfirm factors accounted for most of the differentials in the skilled and unskilled jobs. However, there was substantial variation in the pattern within the different occupations so that other factors besides skill levels may be at work.

Rank correlation coefficients between relative wage dispersion and proportion of dispersion accounted for by interestablishment differentials in 13 labor markets indicated positive relations:

	r_r
office and clerical	.643
plant maintenance	.709
plant laboring	.517

Significance of Wage Rate Dispersion. The principal conclusion is that the major source of occupational wage dispersion in labor markets is the difference in wage levels among establishments. Intrafirm wage differences have some importance, primarily for office clerical jobs. The existence of such intrafirm dispersion means that the hierarchy between low and high wage firms is not clearly defined and that some overlapping of rates is likely to occur.

Why do labor markets differ in the extent of dispersion? Douty

Table 1

Coefficients of Variation of Wage or Salary Rates: Medians and
Ranges for Selected Occupations in Manufacturing
Among Thirteen Labor Markets, 1959-1960

Occupation	Lowest Labor Market Coefficient	Median Labor Market Coefficient	Highest Labor Market Coefficient
Key punch operators	10.3	15.3	20.7
Typists, class B	10.8	14.7	20.9
Stenographers, general	10.4	15.7	24.5
Carpenters, maintenance	6.6	13.5	25.4
Electricians, maintenance	9.2	12.4	16.2
Machinists, maintenance	5.8	11.8	16.6
Janitors, porters, and cleaners	7.7	16.5	31.3
Laborers, material handling	7.8	17.1	31.0
Packers, shipping	7.7	17.2	32.8
Power truckers, fork lift	6.2	13.5	25.0

Source: Bureau of Labor Statistics, U. S. Department of Labor

Table 3

Percentage of Wage or Salary Rate Dispersion* Accounted for by Rate Differences Among Establishments: Medians and Ranges for Selected Occupations in Manufacturing Among Thirteen Labor Markets, 1959-1960

Occupation	Lowest Labor Market Proportion	Median Labor Market Proportion	Highest Labor Market Proportion
Key punch operators	53	73	94
Typists, class B	69	81	98
Stenographers, general	43	74	86
Carpenters, maintenance	76	93	98
Electricians, maintenance	80	94	99
Machinists, maintenance	78	91	99
Janitors, porters, and cleaners	82	96	98
Laborers, material handling	81	95	98
Packers, shipping	62	93	94
Power truckers, fork lift	68	94	98

Source: Bureau of Labor Statistics, U. S. Department of Labor.

*As measured by mean of squared deviations of individual establishment averages from over-all average.

suggests that the reason is likely to lie in the differences in industrial composition, supply of labor, and degree of unionization among the different areas.

Why do interfirm differences contribute less to total dispersion in office jobs than elsewhere? It is possible that the market for office workers may be better organized than for plant workers, though there is no clear cut evidence on this. Since the employers were the same for both groups in this study, it is not likely that the cause lies on the demand side. However, there may be differences on the supply side, since business and secretarial schools usually provide their students with labor market information. Differences in wage administration may account for the lesser influence of interfirm differences in office jobs. Usually, rate ranges are more prevalent among office personnel than plant personnel, and where ranges exist for both groups, the range is generally wider for office workers. Furthermore, advancement within the range is usually less automatic for office workers than for plant employees.

The role of collective bargaining in manual wage dispersion is not clear. In general, the policy of standard rates would tend to reduce differentials between firms in the same product market. But since the product market is generally wider than the labor market, interfirm differentials may be increased, although both union policy and union strength vary considerably in this respect.

The crucial questions for further investigation are why occupational wage dispersion tends to be relatively greater in some labor markets, and some occupations, than others, and why there are

such significant differences in the extent of the contributions of interfirm and intrafirm variations to the total. More attention needs to be given to differences in productiveness among workers; perhaps too much stress has hitherto been placed on imperfections of the market and unionism.

Richard Perlman, "Force Widening Occupational Wage Differentials," Review of Economics and Statistics, May 1958.

This paper presents a heretical view: that the current tendency is for a stabilized differential and the future trend toward a widening differential.

Statistical Studies. Kanninen's analysis¹ seemed to show an accelerating rate of compression of differentials, since his figure for the average skilled wage in manufacturing was 137 per cent of the unskilled average for 1952-53, whereas Ober's figure for 1945-47 was 155 per cent, itself a decline from 205 per cent in 1907.² However, the data and methods of the two studies differed. Perlman adjusted Kanninen's data to Ober's method and the result was an index of 145 instead of 137. (While Ober's data referred to all crafts, Kanninen used only maintenance jobs; in textiles, for example, loom fixers earn more than skilled maintenance men, and therefore even the adjusted index is probably on the low side.

Recent Trends. From 1953-56 there was no appreciable difference in the increases of skilled and unskilled. In 17 labor market areas, the 1955 index for skilled maintenance workers (Kanninen's group) stood at 109.3, with 1953 = 100; the index for unskilled plant workers was 110.5.³ This stability continued into 1956, when the skilled index averaged 116.1 and the unskilled 116.6.⁴ In

1. "Occupational Wage Relationships in Manufacturing," Monthly Labor Review, November, 1953, p. 1171.

2. "Occupational Wage Differentials, 1907-1947," Monthly Labor Review, August 1948, p. 127.

3. "Area Wage Trends for Selected Occupational Groups," Monthly Labor Review, November 1955, p. 1249. Simple averages were taken.

4. "Earnings and Wage Differentials in 17 Labor Markets, 1955-56," Monthly Labor Review, September 1956, p. 1041.

fact by eliminating Atlanta, Ga., (where the unskilled index jumped from 107.9 in 1955 to 122.6 in 1956, largely because of a rise in the statutory minimum wage in that year), the data show a slightly greater increase for skilled workers.

In short, there was a slight narrowing of the differential from 1945-47 (Ober: 155) to 1952-53 (adjusted Kanninen index: 145). And since 1953 the differential has remained constant.

Widening Forces. Differentials widen during depressions, when unemployment is more severe among the unskilled, but they also widen during full employment. The shortage of unskilled workers has been widely noted, but less has been said about the concurrent shortage of skilled labor. The only immediate source of supply of additional skilled labor comes from the ranks below; training takes time. The source of supply of unskilled labor under full employment is larger. There is a temptation to consider the supply of unskilled labor inelastic (as Reder does), but it is more elastic than the supply of skilled labor: agricultural workers are a source of supply for industry; and there are other groups -- women, handicapped, etc. -- who make for flexibility in the size of the work force, entering a tight labor market mostly in unskilled jobs. The extent to which the work force, apart from population growth, has adjusted its size to the country's employment needs, is indicated by the figures:

Labor force as a
percentage of population
14 years and over

1929	55.8
1935	55.7
1940	55.4
1944	62.4
1950	58.3
1955	58.7
1956 (est.)	59.5

Theory: Labor Supply. At first sight it appears inconsistent to claim that differentials widen under conditions both of depression and of full employment. The explanation is that the supply curve for skilled labor is more elastic than for unskilled under low-wage low-employment conditions -- because of the opportunity of movement down the ladder of skill -- and less elastic under conditions of full employment.

Demand Considerations. Much has been said on the leveling effects of machinery on the premium for skill. It is argued that more and better machines have reduced the responsibilities and difficulties of skilled work. On the other hand, it has also been argued that supporting machinery has made the unskilled janitor more productive; it is illogical to give credit to the machine when it aids a skilled worker and to credit the unskilled worker when he is aided by a machine.

That machines have made skilled work easier has obscured the fact that our changing technology has required relatively more skilled than unskilled workers. From 1940 to 1950, the proportion of skilled workers rose from 11.7 to 13.8 per cent of the work force, and the unskilled fell from 14.7 to 7.8 per cent (U. S. Department of Labor, The American Workers' Fact Book, 1956, p. 20). This indicates a distinct change in the skill mix of the work force.

Automation requires a highly trained, skilled force of maintenance workers; even though the skill needs for operators in the automatic processes will decline, the more significant influence will be the increased need for maintenance craftsmen.

International Examples. The relative strength of narrowing forces (growth of education, egalitarian sentiment, inflation) and widening forces

(advanced technology and full employment or mass unemployment) can be estimated in other countries.

Differentials are extremely narrow in France and Italy where egalitarian sentiment is strong, inflation has been severe, and mass education has exceeded the pace of industrialization. Differentials are wide in Canada and the United States, where the reverse situation prevails. The Scandinavian countries lie between these extremes; in periods of price stability, the widening influence of advances in industrialization has been felt on differentials there. When egalitarian sentiments have proceeded too far, economic forces have erupted in the wage glide.

Conclusion. The downward movement of the skill differential has halted; the future trend will probably be in the direction of a higher differential.

The strongest narrowing force, inflation, will probably be contained. Further mechanization in a full employment economy will increase the demand for skilled labor. As the skilled proportion of the work force increases, the ranks of the unskilled will be filled by transients, the very young and the very old, handicapped workers -- mostly unorganized, and weak in bargaining power.

Thus the question is not whether the differential will remain wide enough to induce workers to acquire skills but, assuming stable prices and an expanding economy, whether egalitarian measures will be taken outside the framework of market forces to limit the widening of the differential.

GEOGRAPHIC

Joseph W. Bloch, "Regional Wage Differentials: 1907-46,"
Monthly Labor Review, April, 1948.

From studies of average hourly earnings in manufacturing occupations throughout the country in 1907, 1919, 1931-32, and 1946-47, the Bureau of Labor Statistics analyzed the long-term movement in wage differentials among the four regions (South, Far West, Midwest, and Northeast) of the country. For each period, the hourly earnings of workers of roughly equivalent skill levels, doing essentially the same type of work in the same industries, were compared. Such a comparison is not significantly influenced by regional differences in industrial structure, nor by interregional shifts in industry or labor.

The persistence of lower wage levels in the South, long considered the core of the regional wage problem, has influenced the pattern of industry location and labor migration. Over the 40-year period covered by this study, the relative wage position of the South showed no progressive improvement which might be attributed to long-term forces affecting the industry and population of the South.

However, as Table 1 indicates, over the period 1919 to 1945-46, differentials first widened, then returned to their former level. The reasons for the decline are more difficult to determine than for the subsequent improvement between 1931-32 and 1945-46. Because of the relatively lower wages in the South, this region was undoubtedly affected to a greater proportionate extent than others by the National Recovery Act codes, the Fair Labor Standards Act, and other Federal wage

TABLE 1

Median Regional Differences in Occupational Wage Rates in
Manufacturing Industries, by Skill and Sex, Selected Periods

(Wage rates for corresponding occupations in the Northeast = 100)

Occupational category and period	Median relation to Northeast (in percent)		
	South	Middle West	Far West
All occupations:			
1907	86	100	130
1919	87	97	115
1931-32	74	97	113
1945-46	85	101	115
Men's occupations:			
1907	88	100	131
1919	88	98	117
1931-32	74	97	114
1945-46	84	102	115
Men's skilled occupations:			
1907	93	99	131
1919	95	98	(1)
1931-32	83	96	(1)
1945-46	91	101	113
Women's occupations:			
1907	(1)	(1)	(1)
1919	81	92	(1)
1931-32	73	(1)	(1)
1945-46	87	98	114

¹Number of occupations covered too small to justify selection of median.

legislation; by the spread of unionization; and by the full employment of the war years.

The median relationships also indicate that the relative wage advantage of the skilled over the semiskilled and unskilled was greater in the South than in other regions. Also, in contrast with the situation of men workers, the wage position of women in the South relative to the Northeast appeared to be substantially better in 1945-46 than during the earlier periods studied.

The Far West, and particularly the Pacific Coast, has long been a high-wage region. The relative status of the Far West declined between 1907 and the early 1920's but, from that time until the present, it has retained an appreciable advantage over the rest of the country. This long-term stability bears out the conclusion that the growth of industry and the heavy immigration of population that have characterized the development of the Far West during the past three decades have not created an impetus towards equalization of wage rates between the Far West and the rest of the country.

The major conclusion of this study is that there does not appear to be any long-term pressure to reduce regional wage differentials. Moreover, there was no significant change in the ranking of the four regions. In the absence of strong counterforces, regional differences tend to be self-perpetuating because of dependence upon local conditions in establishing job rates. This contrasts sharply with the pricing policies of industrial establishments competing in regional or national markets.

Martin Segal, "Regional Wage Differences in Manufacturing in the Postwar Period," Review of Economics and Statistics, May, 1961.

This paper examines the changes in the regional wage differences in manufacturing for the period 1947-54, and considers the major factors responsible for these changes. The data used are average hourly earnings in 193 industries, employing 56.5 per cent of all manufacturing workers. The study examines only relative regional wage differentials.

Table 1 indicates the extent of wage differentiation for the industries in the sample.

The slight narrowing of regional wage differentials appears to be consistent with the movement of workers that occurred. Between 1945-54, the South experienced a net outmigration of more than 1,300,000 people. The West gained substantial numbers of new workers, and the South and the West expanded their manufacturing employment at a rate faster than the North Central or the Northeast.

Since "natural market" influences (demand and supply relations) tended only moderately to narrow regional wage differences in 1947-54, any marked influence by collective bargaining on the geographic wage structure should be visible in differences between the wage behavior of the local market and the multi-plant firm sectors. (Wage policies evolved under collective bargaining might of course reflect not only unions' but managements' preference for uniformity.) Both the incentive and the ability of unions to impose greater geographical uniformity might be expected to be weakest in those industries with predominantly local employers facing local product-

TABLE 1

Median Regional Differences In
Average Hourly Earnings of 193 Industries, 1947-54

(Earnings for corresponding industries in the Northeast=100)

<u>Region</u>	<u>1947</u>	<u>1954</u>
Northeast	100.0	100.0
North Central	99.1	101.4
South	81.3	82.7
West	108.5	106.7

market competition. Also, local unions would tend to have more autonomy in these industries, and union strength would probably differ sharply from locality to locality. These conditions might well induce a widening of geographic differentials.

At the other extreme are the industries dominated by multi-plant firms operating on a national scale. Here, collective bargaining, with stronger and more centralized unions, might be expected to contribute to the narrowing of wage differentials. In between would be the national market sector, where at least some firms compete in national markets, and where the tendency of unions would be to reduce regional differentials but with varying success depending on the nature and extent of the product market.

Table 2 presents data on the movement of regional earnings differentials for the categories indicated.

The significant difference¹ in the movement of differentials between the local market and multi-plant firm sectors cannot be explained by the functioning of a "natural market." The only reasonable explanation is that union and management policies exerted a differing impact on wage differentials.

The national market sector had a tendency toward convergence that was stronger than the local or regional group but weaker than the multi-plant firm sector. This was predictable.

The author concluded that while collective bargaining exerted a

1. According to the Chi-square test, the chances are less than 3 out of 100 that this difference was a result of random factors.

TABLE 2

Narrowing and Widening of Regional Earnings Differences
in 193 Industries, 1947-54

Category	Total Number	<u>Differences Narrowed</u>		<u>Differences Widened</u>	
		Number	Per Cent of Sample	Number	Per Cent of Sample
All industries	193	112	58.0	81	42.0
Local or regional market industries	36	15	42.0	21	58.0
Multi-plant firm industries	30	21	70.0	9	30.0
National market industries	127	76	60.0	51	40.0

distinct influence on regional wage differentials, its influence varied greatly, in extent and direction, among the different sectors. Collective bargaining fell far short, even in a period of full employment, of producing a comprehensive tendency toward reduction of regional differentials. In the absence of complete and uniform unionization, the critical factors in regional wage differences appear to be the extent of the product market and the structure of firms predominating in the industry.

John V. Van Sickle, "Regional Economic Adjustments: The Role of Geographical Wage Differentials," American Economic Review, May, 1954.

The problem of regional adjustments within the United States is similar to the problems of adjustments between countries. Workers probably move more freely from one part to another of the extensive territories of the U.S. than they do within the smaller territories of other national states. Capital is extremely fluid in the U.S., owing to highly developed public and private financial institutions. Nonetheless, interregional labor mobility is so sluggish compared to such capital movements that we are justified in basing our concept of economic regions on labor market areas. A region is a consolidated area within which the resources on which the population must depend result in a pattern of factoral rewards which sets it off from adjacent areas.

Agriculture, the single most important industry in the South, imposes a distinct pattern of wages throughout the area. Firms using unskilled labor need only offer enough to attract men from the nearby farms. On the other hand, skilled labor is relatively scarce. This condition produces the greater differentials in the wage structure of the South relative to the urbanized, industrialized North.

In a market economy, the structure of wage differentials performs the important function of providing businessmen with one of the signals they need in making locational decisions. A function of competitive market prices is to induce the transfer of productive activities to locations where the pattern of costs is such that they can be carried on profitably.

Until recently, the actual geographical pattern of wages was in

rough conformity with the pattern that traditional economic theory postulated. Such a pattern induces workers to move to regions where their marginal productivities are higher. Secondly, it provides capital the inducement to move where its marginal productivity is higher because of the ability to make use of particular types of labor. Any general fiat geographical equalization of money wage rates for comparable jobs would destroy this essential part of the price mechanism; the prospects of realizing a pattern of regional specialization based on comparative advantage could not be realized; centralizing forces in the economy would be strengthened.

Big business is, on balance, highly competitive; it respects the natural geographical pattern of wages, plans its operations on the basis of the existing pattern, and in the process brings about interregional movements of factors that modify the pattern in the direction of greater geographical wage uniformities for comparable jobs.

The same cannot be said of our great national trade unions. The labor leader, as opposed to the businessman, seeks to eliminate wage differentials. These unions are not subject to the same degree of competition as are the managements of corporations.

Therefore, the following recommendations are made:

1. The federal government should cease to use federal aid for the purpose of regional equalization; it should also cease to impose unnatural wage patterns on low-income states; what these states lose in federal aid, they will recoup in increased ability to attract capital.
2. The Walsh-Healey¹ and Fair Labor Standards Acts² should be repealed. The former is not being administered in accord with the original

intent and the latter has been rendered innocuous by inflation.

3. The problem of defining the rights and duties of trade unions should be returned to the states, leaving to the federal government the task of enforcing the antitrust laws impartially against business and labor.

1. Establishes minimum standards for work done under government contract.

2. Includes minimum wage provision for employment in "interstate commerce," which also covers manufacturing industries.

R. Bunting, L. Ashby and P. Prosper, Jr., "Labor Mobility in Three Southern States," Industrial and Labor Relations Review, April, 1961.

This article reports some of the results of a study of labor mobility in Georgia, North Carolina, and South Carolina in 1953. The basic data, for a sample of over 30,000 workers, representing a population in excess of three million, were obtained from the Bureau of Old-Age and Survivors Insurance. OASI data are reliable sources of information on worker mobility, although (a) approximately 21 per cent of nonmilitary employment was not covered by OASDI in 1953; and (b) use of these data leads to the inclusion of dual job holders, and workers whose firms experienced a change in ownership, as "mobile" workers.

Table 1 shows the number of workers in the various classes who had at least two employers during 1953, expressed as a percentage of the total number of workers in each class. The percentages in Table 1 range from a low of 14.6 to a high of 49.5. Clearly, the level of mobility varies within age, race, and sex classes. The data seem to support the findings of previous studies: that Negroes tend to be more mobile than non-Negroes, that males tend to be more mobile than females, and that "young" workers tend to be more mobile than "old" workers.

Table 2 is designed to facilitate an investigation of each of these relationships separately. It shows a new phenomenon, i.e., that Negro females are less mobile than non-Negro females, about 11 per cent less.

These findings suggest more particularized hypotheses with regard to the effect of distance on the age-sex-race composition of mobility: as distance moved increases, the ratio of young workers to old workers,

TABLE 1

Mobility Percentages of Workers in North Carolina,
South Carolina, and Georgia, 1953, by Age,
Sex, and Race.^a

Age ^d and sex	Mobility ^b Percentages ^c		
	Total	Negro	Non-Negro
All workers	29.3	34.6	27.6
less than 30	36.0	42.8	33.9
30 and over	24.9	29.3	23.4
Males	34.3	41.7	31.6
less than 30	41.8	49.5	38.7
30 and over	29.8	36.4	27.5
Females	20.8	16.9	21.3
less than 30	27.4	26.4	27.6
30 and over	15.8	14.6	16.2

^aThe workers to whom the data in this table apply are those who are in the Bureau of Old-Age and Survivors Insurance 1 percent continuous work history sample and whose first and/or last covered employers were located in the three-state area in 1953. "State-wide" workers are included.

^bA mobile worker is one who had two or more covered employers in 1953.

^cMobility percentages are computed by dividing the total number of workers in the class into the number of mobile workers in that class.

^dThe class "30 and over" includes a small number of workers whose ages were not known. The division between age groups at 30, though reasonable as a natural mobility breaking point (in the light of other empirical findings), is essentially arbitrary.

the ratio of males to females, and the ratio of Negro males to non-Negro males all increases; but the ratio of Negro females to non-Negro females does not increase. To test these hypotheses, mobile workers were broken into three groups: short, intermediate, and long distance moved (Table 7).

In general, the data support these hypotheses, but also indicate the presence of mobility determinants other than age, sex, and race. The one which would appear to be the most likely explanation of the age and race deviations is what might be called the education-skill-occupation complex: the market for more highly qualified workers is less restricted spatially and the supply of such workers is essentially heavily weighted with older male non-Negroes.

Robert L. Bunting, "A Test of the Theory of Geographic Mobility," Industrial and Labor Relations Review, October 1961.

The ability of wage differentials to perform the function of allocating labor supplies, as posited by conventional economic theory, is the central issue of recent research on labor motility. Most mobility studies, however, have taken the local labor market as the framework for study and analysis of interfirm, interindustry, or interoccupational movements of workers. This article is concerned with rural-urban and interregional worker movements with respect to appropriate differences in money wages. The results tend to support the hypothesis that the flow of workers in movement are typically from areas of low net advantage to areas of high net advantage, as measured by income differentials.

The area chosen for study was the so-called "Urban Crescent," comprised of 16 contiguous counties in Central North Carolina and Northern South Carolina. OASDI data were consulted for 1953 to determine net movements from rural to urban areas and from southern low wage to other high wage areas. The differentials in existence at the time were as follows (mean quarterly income):

Metropolitan Areas

No. Carolina	\$ 710.00
So. Carolina	792.00
Georgia	732.00
Three-State Area	736.00

Non-Metropolitan Areas

\$ 615.00
607.00
548.00
594.00

Comparing the average quarterly wages of the three-state area as a whole with the comparable figures for the nation at large, the same

source showed the following:

North Carolina, South Carolina and Georgia	\$654.00
United States	851.00

Findings:

Labor movement within the "local" area was consistent with the predictions of the theory -- each of the county groupings containing metropolitan areas gained workers from the areas surrounding it; those groupings containing no metropolitan areas lost to the metropolitan groups. All non-metropolitan county groups were net losers of workers; two of the three metropolitan groups were net gainers (the third was a net loser due, apparently, to the completion of a large Atomic Energy Commission construction project).

The interregional movements verified the South to North migration.

The use of OASI data meant that only those workers who had been covered by the program on at least two jobs during 1953 could be included in the 1 per cent sample; since many agricultural workers are not covered, the migration with respect to rural-urban and South-North was understated.

Jesse W. Markham, "Some Comments upon the North-South Differential,"
Southern Economic Journal, January, 1950.

In a recent article (SEJ, Oct., 1948) Professors Sufrin, Swinyard, and Stephenson attempted to account for the North-South annual-earnings differential by analyzing this variable in terms of phenomena which characterize the two regions. They concluded that the differential is a product of two factors: (1) size of capital investment in the market, and (2) productivity of labor. This paper examines the validity of the conclusions and offers an alternative explanation.

The difference in size of capital investment in urban centers between the two regions is due to the difference in the nature of the investment. This distinction is extremely important. Most economists who have studied the South would agree that personal incomes in that region will be increased not so much by attracting further investment in industries already concentrated in the South, but by attracting industries of an entirely different nature.

To indicate the relationship between industrial structure and earnings, the percentage of Southern workers employed in the 19 major industrial classifications was plotted against the annual income received per wage earner in the respective classifications. The result was a coefficient of correlation of $-.554$ -- the lower the proportion of total workers in the South, the higher was total income. (See also Table 1.)

Productivity differences are no doubt an important factor but this is not proved by using statistics of "value added by manufacture" since wages and salaries account for over 50 per cent of this figure. Hence, the statistical operation merely correlates one variable A, with another variable $A + B$.

Table 1

Per Cent of North-South Labor Force in the South and Average Annual Income by Major Industrial Group, 1939

Industrial Group	Total North-South Labor Force (000 omitted)	Per Cent in South	Average Annual Wage
Food and kindred products	965	24.6	\$ 1,110
Tobacco manufactures	106	56.5	783
Textile mill products	1,155	45.1	839
Apparel, etc.	752	15.0	871
Lumber and timber basic products	439	73.4	861
Furniture and finished lumber products	331	31.0	936
Paper and allied products	306	16.7	1,171
Printing, publishing, and allied products	565	18.6	1,521
Chemicals and allied products	417	33.8	1,241
Products of petroleum and coal	175	38.8	1,648
Rubber goods	148	6.7	1,337
Leather and leather products	359	8.1	898
Stone, clay, and glass products	313	23.3	1,146
Iron and steel and their products except machinery	1,212	12.4	1,359
Nonferrous metals and their products	254	10.6	1,308
Electrical machinery	365	3.6	1,309
Machinery (except electrical)	665	7.4	1,431
Automobiles and automobile equipment	560	3.2	1,620
Transportation equipment (except automobiles)	801	9.4	1,523

Source: 1939 Census of Manufactures, U. S. Bureau of the Census

Wilfred H. Crook, "Recent Developments in the North-South Wage Differential," Industrial and Labor Relations Review, October, 1952.

This study analyzes the North-South wage differential in the textile industry. The differential has decreased consistently over time: in 1900 it stood at 50 per cent; in 1920 at 25 per cent; and in 1945 the Southern wage in the cotton textile industry was only 14 per cent below that of the North. The importance of the industry in the South is indicated by the fact that it accounted for over 50 per cent of all manufacturing workers in 1940 throughout the Southeast (Ala., Fla., Ga., Miss., N.C., S.C., and Tenn.). As a result, the South's share of the nation's manufacturing payroll was 11 per cent in 1940, although the South had 18 per cent of the national work force.

The South has long had a surplus of labor as a result of a higher rate of population growth than the rest of the country. In addition, farm mechanization has added and continues to add to the surplus of labor. In contrast, the North has long experienced difficulty in finding an adequate supply of labor for its textile mills. One migrant stream after another has been tapped for its labor resources. In the North, industries competing for labor with the textile mills are, with few exceptions, high-wage industries. Also, the degree of unionization is much greater in the North.

Recent developments in the South lend support to the hypothesis that the long-term trend is toward the reduction or abolition of the differential. In 1951, the South's expanding economy averaged one new multimillion-dollar industrial plant every working day. For the first time on a very large scale, defense plants are locating in the South. The wage levels of these industries are far above the best Southern

textile rates. Also, unionization of Southern textile mills is rapidly progressing. All of these factors point to a continuous diminution of the North-South wage differential in the textile industry.

Seymour E. Harris, "Interregional Competition: With Particular Reference to North-South Competition," American Economic Review, May, 1954.

In classical economics, it is assumed that a country or region which suffers a competitive deterioration adjusts to the situation as its balance of trade becomes adverse. In fact, the expected inter-regional adjustments do not occur, or do so only after costly delays, for the following reasons: (1) unions create wage rigidities; (2) government spending, tax and tariff policies may add to the burden on the deteriorated region; (3) labor does not move easily; (4) artificial restrictions on imports are not available to the extent that they are in international trade.

When classical economics assumes that prices and costs would rise in the regions where exports are rapidly rising, it fails to allow sufficiently for the vast untapped supply of unskilled labor from the farms. This constant movement from the farms tends to depress wage rates and prices in the South and delays adjustments.

Despite the obstacles, there is evidence that adjustments are slowly being made. Thus, although New England was at one time a high-wage area, this is no longer true. The effect of the continued pressure on her balance of payments has been a tendency for New England to become a low-wage area. In 1950, national average hourly earnings in manufacturing ^{were} \$1.46 as compared with \$1.38 in New England. It is generally assumed that the older industrial region yields its industries to newer rivals, and then moves on itself to more advanced industries. But it is not always clear that the movement is in the right direction. New England's gains have been in part in the newer industries, but

frequently at wage rates below the national average for those industries. From 1919 to 1947, New England added 162,000 jobs in the 10 manufacturing industries growing most rapidly, which constituted about $\frac{1}{4}$ per cent of the additional jobs in these industries in the nation, a proportion much below the region's 9-10 per cent of all manufacturing jobs in the economy. A weighted average of wages in 1950 in three weak, soft industries and in eight strong, growing industries yielded the following figures for New England: \$1.29 in the weak industries or 106 per cent relative to U.S. wages; and \$1.49 in the strong industries or 94 per cent of the national average.

Lloyd Seville, "Earnings of Skilled and Unskilled Workers in New England and the South," Journal of Political Economy, October, 1954.

The traditional view that wages paid in the South are lower than in the North may need revision. Recent changes in several industries have brought average straight-time hourly earnings of skilled workers in the Southeast above the wages of comparable workers in New England. On an overall basis, wages are still higher in the North, but not in every industry or in every skill.

The study is divided into two parts: a detailed examination of representative office and production occupations in five industries (cotton textiles, woolen textiles, industrial chemicals, hosiery, and electric and gas utilities), and a general investigation of 31 industries.

Table 1 is a summary of wage conditions, and Table 2 of supplementary wage payments, hours, and fringe benefits, for the selected occupations in the five industries.

In the cotton and woolen textile industries differentials increased for most occupations from 1946-48 to 1951-52. However, women office workers' earnings were higher for both periods in the Southeast.

In the hosiery industry, all production occupations showed higher earnings in the Southeast. However, only 2½ per cent of the industry is located in the Northeast while 63 per cent is located in the Southeast.

Only 5 per cent of the total national production in the industrial chemical industry occurs in the two regions. Although differentials were generally higher in the Northeast for the two periods, they declined in every instance.

In 1946-48, average wages in the electric and gas utilities industry

were generally higher in the Northeast; in 1951-52 the reverse was true. The reversal was mostly due to the relatively greater expansion of the electrical utility industry in the Southeast.

Table 2 indicates that, among production workers, supplements to wages, hours, and fringe benefits are more favorable in the Northeast, with the single exception of Christmas or year-end bonuses, which are traditional in the South.

Table 5 indicates that, from 1946-48 to 1951-52, in all the industries except hosiery, there has been some equalization of geographical differentials among skilled workers. It thus appears that skill tends to reduce or eliminate occupational wage differentials against the Southeast.

Analysis of the 31 industries was made by selecting one skilled and one unskilled occupation from each industry in a predetermined preferential sequence. Proportionate geographic differentials in mean hourly earnings for unskilled workers in 84 per cent of the industries were substantially higher than for skilled workers. In the skilled categories, 20 per cent of the industries showed higher mean wages in the Southeast. These included durable and nondurable industries and even some service trades. Unskilled differentials are more influenced by regional location than by industrial affiliation. These comparisons tend to support the hypothesis that the mean earnings of skilled workers behave differently than those of the unskilled.

In conclusion, the regional wage differential for unskilled work has increased over the period. The much wider use of escalator clauses in the Northeast is an important cause of the increased differential.

Wages of office and skilled occupations in the Southeast have advanced, relative to the Northeast, so that differentials have narrowed, and, in many cases, disappeared.

Victor R. Fuchs and Richard Perlman, "Recent Trends in Southern Wage Differentials," Review of Economics and Statistics, August 1960.

A high birth rate, a declining demand for labor in agriculture and poor educational facilities have traditionally provided the South with a large supply of untrained labor for manufacturing industries. These conditions suggest the following hypotheses:

1. Average wages in manufacturing will be relatively low in the South because the industrial structure will tend to be heavily weighted with low-wage, low-skill industries.
2. Because labor and capital are not perfectly mobile, Southern wages will tend to be lower than elsewhere for equal work.
3. For the same reasons, Southern wages will be particularly low for work requiring little skill and training.
4. Because of the wage differentials, the South should be gaining in manufacturing relative to the rest of the U.S.
5. Because the differential is greatest in low-wage industries, the South should be gaining most in those industries which make the greatest use of low-wage labor.

Table 1 presents measures of wage levels in the South relative to the rest of the U.S. for the period 1929-54. The measures in Part A represent average annual earnings per production worker in the South relative to his counterpart in the rest of the nation. The measures in Part B show what the relative average annual earnings would have been if every Southern worker had been paid at the national rate for his industry. They indicate the extent to which low Southern wages are attributable to the preponderance of low-wage industries in the South. Part C represents

TABLE 1

Wage Levels in the South Relative to
the National Average, 1929-54

	1929	1947	1954
A. Relative wage level			
South Atlantic Region	69.7	79.4	77.1
East South Central Region	70.9	77.2	79.1
B. Relative wage level according to industrial mix			
South Atlantic	81.8	89.0	86.0
East South Central	90.0	92.3	90.5
C. Standardized wage			
South Atlantic	85.2	89.2	89.6
East South Central	76.8	83.6	87.4

measures of relative annual earnings per worker after eliminating the direct influence of industrial structure. They show what the relative annual earnings in the South would have been if the U.S. had the same industrial mix as the South. Thus they are an indication of the degree to which wage variations are attributable to differential rates of pay for similar work.

Annual earnings in Southern manufacturing are below the national average. This is attributable in about equal proportions to a poor industry mix and to relatively low earnings for similar work.

Median average hourly earnings in 1954 for the 221 industries used in the study were \$1.71. Eighty-six fell within the range \$1.90-1.50. Industries above and below this range were called high- and low-wage industries for the purposes of Table 2. The measures in Part A of Table 2 are derived in the same manner as Part C of Table 1 but are confined to the high-and low-wage industries; that is, they measure the relative wage level, adjusted for industrial structure. This supports the third hypothesis that the South's worst wage position is in the low-wage industries. However, where the data are not weighted by employment (Part B) the differences between high-and low-wage industries tend to disappear. On the individual industry level, other forces such as company or union wage policy may be more important in determining the industry's interregional wage position than its position in the wage structure or its use of a region's scarce or plentiful types of labor. Such wage differentials might be expected to give an impetus to the growth of manufacturing in the South. Table 3 indicates that such was not the case. However, the relative rate of growth of all manufacturing

TABLE 2

Southern Standardized Wages
High and Low-Wage Industries, 1929-54

	1929		1954	
	High	Low	High	Low
A. Standardized Wages				
South Atlantic	87.8	75.9	92.7	81.7
East South Central	87.7	69.7	87.1	77.1
B. Standardized Wages, Unweighted				
South Atlantic	85.7	75.8	84.7	87.4
East South Central	79.5	73.8	84.1	82.9

TABLE 3

Relative Gains or Losses in Manufacturing Employment
Unadjusted for Industrial Structure, by Region

Region	1929-54	1947-54
New England	-27.0%	-11.0%
Middle Atlantic	-11.6	-4.6
South Atlantic	13.3	5.1
East South Central	13.0	2.9
Pacific Coast	38.6	24.3

in an area depends on two factors: (1) the rates of growth of specific industries in the area relative to the national rates of growth; and (2) the extent to which the industrial structure of the area is weighted with industries which, at the national level, are fast or slow-growing.

Table 4 shows that the South, on an industry-for-industry basis has been making rapid strides.

But Table 5 indicates the degree to which recent gains in Southern manufacturing have been in low-wage industries.

Population Change

Emigration of labor from the South has been, at best, a neutralizing force offsetting relatively higher natural population increases. From 1930-50, the net population increase was 24.4 per cent for the South compared with a national average of 22.7 per cent. Also, from 1930-48, while the nation lost 9 per cent of its agricultural population, the South lost only 7 per cent, although relatively more people were leaving Southern farms, because of the high natural rate of growth of its farm population.

Even if, in the future, industry moved to the South and labor migrated out of the area to such a degree that Southern workers received the same pay as the rest of the nation for identical work, Southern average wages would remain below national levels because of the preponderance of low-wage industries in the region. Attempts by the South to alter its industrial mix to conform to the national pattern would tend to reduce the demand for, and wages of the, lower-paid workers. Thus, despite the wage improvement in the industry mix, the direction of the

TABLE 4

Relative Gains or Losses of Manufacturing Employment,
Adjusted for Industrial Structure

Region	1929-54	1947-54
New England	-19.6%	-6.0%
Middle Atlantic	-16.2	-5.2
South Atlantic	32.6	11.2
East South Central	30.1	9.9
Pacific	31.3	9.8

TABLE 5

Median Average Hourly Earnings (U.S. Rate) for 25
Industries with Largest Gains and 25 With
Largest Losses (Relative to U.S.)

Region	1929-34		1947-54	
	Largest Losses	Largest Gains	Largest Losses	Largest Gains
New England	\$1.83	\$1.64	\$1.77	\$1.73
Middle Atlantic	1.88	1.77	1.75	1.75
South Atlantic	1.83	1.57	1.71	1.58
East South Central	1.58	1.57	1.68	1.91
Pacific	1.70	1.94	1.70	1.94

change in the average wage would be uncertain if wages of the largest group of workers declined.

An alternative solution to the encouragement of emigration of workers or special measures to attract high-wage industries, would be an extensive educational effort to raise the level of training and skills of the Southern labor force.

Lowell E. Galloway, "The North-South Wage Differential," Review of Economics and Statistics, August, 1963.

A purely competitive model of a factor market has as an end result an equalization of factor prices throughout the market. If a regional wage differential exists, claiming that the market is imperfect is next to no explanation at all. If it persists, the market is obviously imperfect and barriers to the adjustment process must exist. Thus the task is one of determining which forces work to create differentials. This paper develops empirical tests for several of the suggested explanations.

Consider the following expression:

$$(1) \quad W_x = \frac{\sum w_x h_x}{\sum w_y h_x}$$

where W =average wage of a region, w =average hourly wage rate, h =number of hours worked, and x and y refer to the particular regions. This provides an index for the average wage rate of region x relative to region y by weighting the wage rates of region y by the number of hours worked in the particular employment in region x . The results of this procedure are shown below as a comparison of wage rates in the East South Central (ESC) and South Atlantic States (SAS) with those of the Middle Atlantic States (MAS) for 1954.

The monopsonistic exploitation argument, that workers receive less than their marginal value product, can be empirically tested by comparing the ratios of the wage bill to the total value added for the regions. If monopsonistic exploitation exists, the following condition must hold:

$$(2) \quad \frac{w_s L_s}{O_s^1} < \frac{w_n L_n}{O_n^1}$$

TABLE 1

<u>Region</u>	<u>Hourly Wage Rate Index</u>	<u>Index Adjusted for Industry Mix</u>
MAS	100	100
ESC	79	85
SAS	79	86

where s and n denote South and North, w =money wage rate, L =labor input and O' =value added by manufacture. This was done, industry by industry, to reduce differences in types of work, for approximately 150 industrial classifications. The results are shown in Table 2. A positive difference indicates that equation (2) holds, therefore, supporting the hypothesis. However, consider the respective standard error of the mean and T value: ESC, .75 and 1.33; SAS, .61 and 2.26. These indicate respectively, a 2 1/2 per cent and an 18 per cent probability that the mean of the distribution differs from zero as a result of chance. These results raise doubts as to the validity of the argument. However, some employments are more important in a given region than others, and it is possible that the results would be different if a weighted average was computed. This was done, the results arguing more strongly against the monoponistic exploitation hypothesis as a general cause (it may still be quite valid for particular industries).

Another explanation for differentials would be a relative deficiency of demand for the products of industry as between regions. This argument could only hold for those industries in which there is very little regional specialization and, consequently, little interregional trade; with trade, the price would move to an interregional equilibrium with the excess supply of one region satisfying the excess demand of the other. Therefore, if the argument is valid we will find greater differentials in those industries in which there is limited regional specialization, that is, an index would show an inverse relationship between differentials and specialization.

TABLE 2

Comparison of Ratio of Production Worker Wages
To Total Value Added, Middle Atlantic,
East South Central, and South Atlantic States,
United States, 1954

Ratio of production workers' wages to total value added, Middle Atlantic States, less ratio of production workers' wages to total value added, East South Central and South Atlantic States		Number of Industries	
		East South Central States	South Atlantic States
+33.00	-27.01	1	0
+27.00	-21.01	2	0
+21.00	-15.01	4	2
+15.00	- 9.01	7	13
+ 9.00	- 3.01	24	23
+ 3.00	+ 2.99	53	55
+ 3.00	+ 8.99	30	43
+ 9.00	+14.99	15	14
+15.00	+20.99	5	4
+21.00	+26.99	3	2
Total		144	156

SOURCE: Census of Manufactures, 1954.

Labor supply conditions complicate the problem: the supply, relative to demand, may be greater in the South; the distribution of the supply between industries may differ between regions. The first possibility can be ignored, assuming no interregional differences in the distribution of the total regional labor supplies, the effect of the first possibility is either to magnify or diminish the differentials in both inter and intraregional trade sectors. The second possibility would distort the correlation depending on the probability that a relatively low wage industry in one region is a relatively high wage industry in the other. Table 3 provides some insight into this probability. The test is applicable with those industries in the middle column eliminated.

An index of specialization was constructed by use of the following expression:

$$(3) \quad I = \frac{\sum_{j=1}^n h_{ij} \sum_{i=1}^m h_{ij}}{\sum_{j=1}^n n_{ij} \sum_{i=1}^m h_{ij}}$$

where I =index of specialization, h =number of man hours worked, and i and j =industry and region, respectively. The index assumes no differences in interregional consumption patterns or marginal physical productivity of labor. A value greater than one indicates specialization, relative to the nation. The index was then correlated with the wage differential of that industry, with the following regional correlation coefficients resulting: ESC, -.1821; SAS, -.2856. The deficiency of demand hypothesis is not substantiated.

The excess labor supply argument, as it is normally stated, is logically weak. To define excess supply as existing when differentials exist and then to explain differentials by the presence of excess supply is circular. A better alternative is to define an excess supply in terms of the relative supply of the other factors of production, for example, a relative lack of capital. One cannot really assess the significance of the relative supplies of factors until the regional production functions have been examined.

The fourth explanation, that of different regional production functions, can be tested. Assuming that average and marginal productivity are proportional, an expected wage for southern workers can be computed by multiplying their actual value added per hour by the ratio of northern workers' wages to their value added per hour, that is:

$$(4) \quad w_x^e = \frac{w_y}{V_y} V_x$$

where w^e =expected wage, w =actual wage, V =value added per hour, and x and y refer to regions. Table 4 shows data which indicate that when the actual wage of southern workers is subtracted from the expected wage and expressed as a percentage of the northern workers' wage, the differentials that remain are randomly distributed about zero. The mean value of these differentials, the standard error, and T value are, respectively: ESC = .87, 1.89, .46; SAS = 1.93, 1.86, 1.04. Thus, the respective means have probabilities of 65 and 30 per cent that they differ from zero by chance. Thus, wage

TABLE 4

Wage Differentials After Standardizing
For Differences in Average Value Productivity,
East South Central and South Atlantic States,
United States, 1954

Differential	Region	
	East South Central	South Atlantic
-80.00 -60.01	0	2
-60.00 -40.01	3	3
-40.00 -20.01	21	22
-20.00 - 0.01	50	63
0.00 +19.99	46	44
+20.00 +39.99	12	16
+40.00 +59.99	4	4
+60.00 +79.99	2	1
+80.00 +99.99	0	1
Total	138	156

SOURCE: Census of Manufactures, 1954.

differentials may result from different regional production functions. Whether this is the case depends on whether a region is operating on a different point on the same production function or on another one. Consider a Cobb-Douglas production function and differentiate with respect to the labor input variable, thus by:

$$(5) \quad \frac{dQ}{dL} = a(1-a) \frac{C^a}{L^a} = \text{Marginal Physical Product of Labor}$$

where Q=output, L and C=labor and capital inputs, and a is the exponent of capital. Combining (5) with the production function, converting terms, assuming that the money wage rate equals the marginal value product of labor, and rearranging terms we have:

$$(6) \quad a = 1 - \frac{WL}{Q}$$

From this the value of the exponent a in the production function can be determined. It is apparent that the results of this test will parallel the monopsonistic test because of the common element (cf. eq. (2)). The differences in the values for a, for each region by industry, will be randomly distributed about zero. This argues for similar production functions. However, this test assumes an absence of monopsonistic exploitation, the test for which assumed similar production functions. Examining this circularity reveals that both hypotheses could be valid or invalid, the weight of probability lying with the latter.

The "excess" labor supply argument, restated in terms of factor imbalance, appears to be the most valid; that is, the capital-labor ratio of the South is lower. The key to determining changes in regional wage

rates is then the relationship between the percentage changes in capital and labor inputs. To reduce the wage differential, the differential between the two percentage changes would have to be sufficiently large to offset the existing C/L ratio. Or, symbolically, where ΔR = the difference between

$$(7) \quad \Delta R_S \left(\frac{C^S}{L^S} \right) > \Delta R_N \left(\frac{C^N}{L^N} \right)$$

the percentage changes in capital and labor inputs. Solving for a in eq. (6) to obtain estimates of capital stock by industry for 1954 and combining with expenditures on new capital stock through 1957 resulted in the data of Table 5. These data indicate that over this period conditions were such as to favor a reduction of the North-South wage differential. The period is very brief, admittedly, but is indicative of the development of conditions which will serve to eliminate the differential in time.

TABLE 5

Capital-Labor Input Relationship, by Industry and Region, 1954-1957

Industry	Middle Atlantic States		South Atlantic States		East South Central States	
	$\Delta R(C^2/L^2)$	$\Delta R(C^2/L^2)$	$\Delta R(C^2/L^2)$	$\Delta R(C^2/L^2)$	$\Delta R(C^2/L^2)$	$\Delta R(C^2/L^2)$
Food and Kindred Products	.0000	.0017	.0014	.0003	.0003	.0003
Tobacco Manufactures	.0005	.0014	.0014	.0014	.0014	.0014
Textile Mills	-.0012	.0030	.0030	.0042	.0042	.0042
Apparel and Related Products	.0013	.0045	.0045	.0009	.0009	.0009
Lumber and Wood Products	-.0016	.0061	.0061	.0037	.0037	.0037
Furniture and Fixtures	-.0002	.0145	.0145	.0003	.0003	.0003
Pulp, Paper, and Allied Products	.0013	.0014	.0014	.0227	.0227	.0227
Printing and Publishing	.0002	.0014	.0014	.0036	.0036	.0036
Chemicals and Products	.0000	.0020	.0020	.0011	.0011	.0011
Petroleum and Coal Products	-.0083	-.0210	-.0210	-.0153	-.0153	-.0153
Rubber Products	-.0005	-.0019	-.0019	.0005	.0005	.0005
Leather and Leather Goods	.0006	.0089	.0089	.0005	.0005	.0005
Stone, Clay, and Glass Products	.0047	.0144	.0144	.0225	.0225	.0225
Primary Metal Industries	-.0064	.0202	.0202	.0046	.0046	.0046
Fabricated Metal Industries	.0002	.0053	.0053	.0053	.0053	.0053
Machinery (Except Electrical)	.0002	.0041	.0041	.0084	.0084	.0084
Electrical Machinery	-.0016	.0031	.0031	.0050	.0050	.0050
Transportation Equipment	.0017	-.0056	-.0056	-.0058	-.0058	-.0058
Instruments and Related Products	-.0004	-.0025	-.0025	.0040	.0040	.0040
Miscellaneous Manufacturing	.0003	.0081	.0081	.0074	.0074	.0074

SOURCE: Census of Manufactures, 1954 and Annual Survey of Manufactures, 1955-1957.

L. Earl Lewis, "City Comparisons of Wage Levels and Skill Differentials,"
Monthly Labor Review, June, 1952.

The earnings data used in this study were compiled by the Bureau of Labor Statistics in 1951 for 11 cities. There was substantial regional variation, with wages generally highest on the West Coast and lowest in the South. Intercity wage differentials for comparable work were less pronounced for skilled than unskilled workers. Available evidence indicates a definite long-term reduction in skill differentials. Intercity wage relationships are shown in Table 1.

Differences in the cost of living are often advanced as a reason for regional wage differentials. Table 2 indicates that little correlation exists between wages and the cost of living in the 11 cities.

TABLE 1

Indexes of Straight-Time Earnings¹ for Selected Work Categories Studied
on an All-Industry Basis and for Selected Industries
in 11 Cities, January-June 1951
New York City = 100

City	Jobs studied in all industries				Jobs studied in selected industries ²			
	Indirect manual							
	Office (24 jobs)	All selected groups (22 jobs)	Mainte- nance (10 jobs)	Custodial (4 jobs)	Warehou- sing and shipping (8 jobs)	Machinery manufac- ture (14 jobs)	Building construc- tion (7 jobs)	Auto- repair shops (4 jobs)
Atlanta	90	75	91	73	67	77	70	84
Baltimore	89	84	94	81	81	86	80	87
Boston	87	90	92	90	86	91	85	87
Bridgeport	98	93	96	99	88	100	80	93
Chicago	102	101	107	97	100	102	91	111
Dallas	92	76	87	71	72	83	76	95
Dayton	106	100	104	103	96	116	85	101
Denver	90	84	91	85	80	89	82	94
New York	100	100	100	100	100	100	100	100
Portland (Oreg.)	101	105	110	105	102	104	81	108
San Francisco-								
Oakland	108	109	112	108	107	100	82	114

1. These indexes show the average relationship in earnings levels of selected work categories among the cities studied. The average for each selected job was multiplied by the total employment in the job in all cities combined to arrive at an aggregate used in the comparison. This procedure assumed a constant employment relationship between jobs in all cities. Indexes were based on straight-time earnings, excluding premium pay for overtime and night work. Weekly salaries were used for office workers, while hourly earnings were used for all other work categories except in the building construction industry, for which relatives were based on minimum wage rates agreed upon through collective bargaining and are not necessarily indicative of the level of earnings.

2. Occupations selected for study in these industries were limited to nonoffice jobs representative of different types of work.

TABLE 2

Indexes of Average Earnings¹ for Selected Office
and Indirect Manual-type Occupations in 11
Cities, January-June 1951, and of Total
Cost of City Worker's Family Budget,
October 1951

[New York City=100]

City	Earnings ¹		Cost of city work- er's family budget ²
	Office (24 jobs)	Indirect manual (22 jobs)	
Atlanta	90	75	106
Baltimore	89	84	103
Boston	87	90	103
Bridgeport	98	93	--- ³
Chicago	102	101	102
Dallas	92	76	--- ³
Dayton	106	100	--- ³
Denver	90	84	103
New York City	100	100	100
Portland (Oreg.)	101	105	102
San Francisco-Oakland	108	109	104

1. Excludes premium pay for overtime and night work.

2. For information on the cost and content of the city worker's family budget see Monthly Labor Review, February 1948 (pp. 131-170).

3. Data not available.

W. Goldner, "Labor Market Factors and Skill Differentials in Wage Rates,"
Industrial Relations Research Association, Proceedings, 1957.

Goldner chose the standard metropolitan region as his definition of a labor market in order to secure comparable economic units. A metropolitan region is characterized by its three components -- the metropolis, surrounding suburbs, and rural hinterlands -- interacting as an economic unit.

Goldner chose to use absolute wage differentials rather than relative differentials for two reasons. First, since he used cross-section data, there was no need to deflate the money wages series; and he attributed little importance to the possible effects of money illusion on wage variation. Secondly, absolute differentials did not seem to be associated with area wage levels whereas relative differentials were inversely related to area wage levels. Following the principle that methodology and data transformations should have neutral effects on the analysis, Goldner chose to use the absolute differentials.

The data were drawn from thirty-nine labor-market surveys done by the Bureau of Labor Statistics in 1951-52. Comparability of the data was enhanced by the use of occupationally standardized wage rate averages. Further comparability was assured because the information on unionization was derived from the same sources.

Results

The following regression was estimated from the data:

$$W = 49.36 + .54Z_1 = 1.002Z_2 + .28Z_3 + .21Z_4 \quad (1)$$

$$R^2 = .80$$

where:

- W is the SMA (standard metropolitan area) wage level in cents per hour.
 Z_1 is the proportion of workers covered by union contract.
 Z_2 is the log of the SMA population
 Z_3 is the proportion of SMA employment in durable goods manufacturing.
 Z_4 is the ratio of per capita rural income to per capita urban income in the metropolis.

An economic interpretation of this regression might run as follows:

1. The demand for labor is a function of the population (reflecting indigenous consumption) and of the proportion of durable goods manufacturing (reflecting the industrial and export potential of the area).
2. The supply of labor is a function of the potential mobility of the rural labor force, as roughly measured by the rural-urban income ratio.
3. The greater the degree of unionization, the narrower the wage dispersion is likely to be and the less the diversity of wage policies. Collective bargaining raises the average level of wages by raising the lower end of the wage distribution.

The absolute wage differential is obtained by subtracting the wages of the unskilled workers from the wages of skilled workers. The following regressions define these relationships:

$$S = 114.57 + .46Z_1 + 1.16Z_2 + .04Z_3 + .00Z_4 \quad (2)$$

$$U = 37.15 + .47Z_1 + .72Z_2 + .40Z_3 + .30Z_4 \quad (3)$$

$$S-U = 77.42 + .01Z_1 + .44Z_2 + .36Z_3 + .30Z_4 \quad (4)$$

Where:

- S is the SMA wage level for skilled workers in cents per hour.
 U is the SMA wage level for unskilled workers in cents per hour.

Almost all the explainable variation in the skilled wage level (2) is attributable to variation in the degree of unionization and to the size of the SMA. Unskilled wages are affected primarily by differences in industrial composition and rural-urban income ratios.

Equation (4) indicates that the absolute wage differential is subject to both narrowing and widening forces. The differential tends to widen as the size of the SMA increases. Differences of about 25 per cent in SMA size widen the skill differential by almost half a cent. Since the SMA populations vary in size from 250,000 to 7 million, the total effect of this factor accounts for about 7 cents of the expansion in the skill differential. (Note that the coefficient of Z_2 is about 60 per cent higher for S than for U. Since the skilled wage level is also about 60 per cent above the unskilled level, the wage effects of SMA size are proportional to the level of the wage rates involved. For the same change in SMA size, the skilled wage level will change about 60 per cent more than the unskilled. Thus the absolute differential widens proportionately and relative skill differentials will be roughly constant for SMA's of differing sizes.) In contrast, the differential tends to narrow as the importance of durable goods manufacture becomes greater because the unskilled wage level is raised. The differential also tends to narrow as the rural-urban income ratio rises because the unskilled wage level rises. The effect of unionization on skill differentials is neutral. Unionization changes the level of skilled and unskilled wages by about the same absolute amounts.

Why do these factors affect wages as they do? One obvious reason is the extent of the market. As the size of the economic unit increases,

more specialization and division of labor, and greater efficiency in transportation and marketing, are possible. Furthermore, as the size of the unit increases, the service sector expands and provides alternative employment opportunities for unskilled workers. Hence, unskilled wages will rise as the demand relative to the supply increases.

Despite the congestion and social costs associated with large urban centers, their existence is an expression of their economic efficiency. The association of changes in skill differentials with differences in the proportion of durable goods manufacturing also generates interesting hypotheses. Let us assume that this proportion is a crude index of the propensity to export. As this index rises, the inflow of payments raises, this study suggests, the lower skill and income levels. A similar effect can be noted with regard to the rural-urban income ratio. These are questions which will be explored in future research.

H. M. Douty, "Regional Wage Differentials," Industrial Development and Manufacturers Record, September, 1958.

There are two major difficulties in measuring wage differentials. First, the precise measurement of regional differentials should be in terms of comparable jobs or work operations. In practice, the available data are often such that rough approximations of job comparability must be used. The second problem is a result of the increasing complexity of compensation systems in recent years. Fringe benefits clearly should be taken into account in the measurement of differentials. However, in general, quantitative data by industry on employer expenditures on fringe benefits are meager and hence this factor can only be roughly estimated. In addition, a wage differential does not necessarily reflect a labor cost differential. In terms of cost, a higher wage level in one region as compared with another may be offset wholly or in part, depending on productivity experience in the respective regions.

Despite all the difficulties of measurement, the widespread view that wages for comparable work tend to be lower in the South appears to have substance. In 1945-46, wages in Southern manufacturing were 15 per cent below wages in the Northeast.

There exists a tendency in the South for the differential to vary with the skill of the occupation. This is illustrated in Table 1. The data for the South are an average for 13 selected cities; for the rest of the country, an average of 25 selected cities.

These examples could be multiplied by reference to other industries. Other studies have shown that the differential widens in jobs of lower skill requirements.

TABLE 1

Union Wage Scales in Selected Building Trades, 1956

	<u>Bricklayers</u>	<u>Carpenters</u>	<u>Electricians</u>	<u>Bldg. laborers</u>
South	3.38	2.68	3.05	1.57
Rest of country	3.49	3.05	3.25	2.26

Not only does the Southern wage differential tend to differ among occupations classified by skill; it tends also to differ among industries. In many instances, this intraindustry differential has been reduced or eliminated by union pressure. As we might expect, the differential is greatest in those industries in which relatively unskilled or semiskilled labor forms a large proportion of the work force.

The persistence of a general differential in wages reflects the underlying labor supply situation in the South. For many years, population growth has been greater in the South than in the rest of the country. In addition, low returns in agriculture, combined with dramatic advances in farm mechanization, have propelled large numbers of workers to seek urban employment. It is these relatively unskilled entrants into the industrial labor market who depress the level of wages in the South.

But wage differentials are not static. The key to changes in wages is mobility -- the movement of capital into or the movement of labor out of an area. The persistence of a general wage differential in the South reflects, at least in substantial measure, the imperfections of labor and capital mobility.

A. N. Jarrell, "Job Pay Levels, Differentials, and Trends in 20 Labor Markets," Monthly Labor Review, October 1959.

Wage and salary rates differed widely among and within geographical areas and industrial groups in each of the occupations studied in 20 labor markets by the Bureau of Labor Statistics during 1958-59. The data cover office occupations (23 female occupations, 6 male), four professional and technical occupations, and 14 plant occupations.

Workers in the West Coast and North Central areas were generally the highest paid. Wage differences were greater for unskilled plant workers than for skilled maintenance and office workers. The magnitude of wage differences among the area varied somewhat among occupations.

For a few areas, unusual variation was noted in the relative pay values and rank position among job groups in the manufacturing and non-manufacturing divisions. Office workers in manufacturing in Detroit held a distinct salary advantage over their counterparts in other cities; however, Detroit office pay in non-manufacturing was exceeded in three other cities; and Detroit custodial workers in manufacturing ranked second in the country, whereas in non-manufacturing, Detroit custodial workers averaged only 91 per cent of New York City pay and ranked 9th among the 20. The maximum differential, in percentage terms, was greater for office workers in manufacturing than in non-manufacturing. For skilled maintenance and custodial workers, the maximum differentials were substantially greater in non-manufacturing; maximum differentials for the materials movement group (truck drivers, etc.) were similar for the two broad groups.

With very few exceptions, area-wide averages for men exceeded the

averages for women in the same job categories and areas. For the six office occupations where there were data for both sexes, men's average weekly salaries exceeded women's by as much as \$22, for order clerks; in the three plant jobs, the hourly differentials ranged from \$.03 to \$.17. Differences in industry duties, length of service, and experience probably influence these differentials. The difference between men's and women's earnings was greatly reduced when the comparison was limited to establishments which employed both. For nine jobs, the average difference between men's and women's earnings was 16 per cent in manufacturing and 19 per cent in non-manufacturing establishments, but only 9 and 12 per cent respectively in establishments employing men and women in the same job.

TABLE 1
Average Weekly Salaries for
Four Professional and Technical Occupations,
20 Areas, Winter 1958-59

Area	Draftsmen (men)			Industrial nurses (women)
	Leader	Senior	Junior	
Northeast:				
Boston	\$149.00	\$113.00	\$84.50	\$81.00
Buffalo	153.50	119.00	87.00	92.00
Newark-Jersey City	132.50	114.50	86.00	88.50
New York City	166.50	127.50	87.50	93.00
Philadelphia	149.00	109.00	81.50	85.00
South:				
Atlanta	151.00	110.50	82.50	90.00
Baltimore	138.50	112.00	77.00	89.00
Dallas	120.50	97.00	76.00	84.00
Memphis	---	108.00	72.50	80.00
New Orleans	---	111.50	81.00	84.50
North Central:				
Chicago	145.00	127.00	93.50	92.00
Detroit	---	136.50	96.00	98.00
Milwaukee	147.00	113.00	89.50	87.00
Minneapolis-St. Paul	---	108.00	84.50	85.00
St. Louis	146.50	115.50	89.00	85.00
West:				
Denver	150.50	128.50	82.50	82.50
Los Angeles-Long Beach	142.00	112.50	90.00	97.00
Portland	---	107.50	91.50	85.00
San Francisco-Oakland	132.50	112.50	90.00	94.00
Seattle	121.50	100.00	83.00	94.50

NOTE: Dashes indicate no data reported or data that do not meet publication criteria.

TABLE 2
Relative Pay Levels for Office¹ and Plant²
Workers in 20 Labor Markets,
Winter 1958-59
[New York City = 100]

Area	Office	Skilled maintenance	Custodial	Material movement
Northeast:				
Boston	91	95	95	93
Buffalo	100	107	111	107
Newark-Jersey City	99	105	105	110
New York City	100	100	100	100
Philadelphia	94	101	95	99
South:				
Atlanta	92	91	75	81
Baltimore	93	101	87	94
Dallas	93	90	76	78
Memphis	84	89	72	73
New Orleans	87	95	62	73
North Central:				
Chicago	106	112	104	104
Detroit	113	115	114	112
Milwaukee	98	107	105	107
Minneapolis-St. Paul	91	105	102	106
St. Louis	95	108	96	103
West:				
Denver	94	101	95	98
Los Angeles-Long Beach	108	109	109	109
Portland	99	109	103	106
San Francisco-Oakland	107	114	119	115
Seattle	102	107	110	107

1. These indexes are based on weekly salaries for the following occupations: MEN -- clerks, accounting, class A; clerks, accounting, class B; clerks, order; office boys; tabulating machine operators; WOMEN -- billers, machine (billing); bookkeeping machine operators, class B; clerks, accounting, class A; clerks, accounting, class B; clerks, file class B; clerks, payroll; comptometer operators; keypunch operators; secretaries; stenographer, general; switchboard operators; typists, class A; and typists, class B.

2. The indexes for the various plant-workers groups are based on data for the following occupations: SKILLED MAINTENANCE -- carpenters, electricians, machinists, mechanics-automotive and machine repairmen, and painters; CUSTODIAL -- guards, janitors, janitresses, and watchmen; and MATERIAL MOVEMENT -- forklift operators, material handling laborers, order fillers, shipping packers, shipping and receiving clerks, and truckdrivers.

Toivo P. Kinninen, "Wage Differences Among Labor Markets," Monthly Labor Review, June, 1962.

This study analyzes wage differentials for selected occupations in 82 metropolitan areas during the year ending June 30, 1961.

First, computation of aggregates was made for all industries combined and for manufacturing and nonmanufacturing separately for each area. These area aggregates are the product of (1) the average weekly salaries of both sexes for each of 17 office jobs and the average straight-time hourly earnings for men in each of eight skilled maintenance jobs and for men in the two unskilled plants jobs and (2) the all-industry employment in the job in all (188) Standard Metropolitan Statistical Areas combined. The area aggregates for each job and industry group were then expressed as percentages of like groups in all areas combined.

The dispersion of area pay relatives within and among regions involves a variety of factors, including differences in industrial composition, community size, and unionization. Pay levels in each of the three job groups were highest in large metropolitan areas in which manufacturing employment was concentrated in the metals, metalworking, chemical, petroleum refining and rubber industries. Interregional comparisons did not indicate a consistently higher position for any region. Although Southern areas, as a group, had the lowest pay levels, particularly for unskilled plant workers, individual areas ranked among the nation's high-pay areas. The distribution of area pay relatives for the four major regions is summarized in Table 1.

TABLE 1

Job group and region	Number of areas	Area pay relatives			
		Under 85	85 and under 95	95 and under 105	105 and over
Office clerical					
Northeast	19	3	5	10	1
North Central	22		2	15	5
South	26	6	14	3	3
West	11		3	6	2
Skilled maintenance					
Northeast	18	2	6	7	1
North Central	22		2	13	7
South	21	3	10	5	3
West	8			6	2
Unskilled plant					
Northeast	20	1	7	8	4
North Central	24		2	8	14
South	27	21	2	2	2
West	11		1	5	5

Industrial composition, community size, and unionization are generally interrelated, and the influence of a single factor can seldom be isolated. Hence, the association of relative pay levels with a particular characteristic does not imply a causal relationship.

Industrial composition appeared to be a major factor in determining market pay levels. Nearly all areas with above average pay levels had major concentrations of manufacturing employment in the aforementioned industries.

There also appeared to be a consistent relationship between the size of the community and median pay relatives: the larger the community, the higher the pay relatives. These relationships are summarized in Table 2.

The degree of unionization in an area seems to have a direct influence on pay relatives, although there are significant exceptions which indicate the importance of other factors. Charleston and Rockford, for example, had pay relatives of 110 and 100, respectively, for unskilled plant workers; in each of these areas, between 35 and 40 per cent of the plant workers were covered by agreements. By contrast, Little Rock and Manchester, with 65 per cent covered by agreements, had unskilled pay relatives of 69 and 75, respectively. The two former areas had a large proportion of employment in high-wage industries, while the latter two had little employment in these industries.

TABLE 2

Job group and area population	Median area pay relatives in --			
	Areas where the percent of manufacturing employment in metals, metalworking, chemicals, oil refining, and rubber industries was --			
	Less than 50	50-69	70 or more	All areas
Office clerical				
1 million or more	99	98	106	100
250,000 but less than 1 million	88	97	103	96
Less than 250,000	83		98	90
All areas	89	98	102	97
Skilled maintenance				
1 million or more	96	100	104	101
250,000 but less than 1 million	91	97	103	98
Less than 250,000	87		94	89
All areas	90	98	103	98
Unskilled plant				
1 million or more	100	101	111	103
250,000 but less than 1 million	77	97	110	96
Less than 250,000	83		105	90
All areas	81	100	110	97

Scott E. Pardee, A Study of Inter-City Wage Differentials, Federal Reserve Bank of Boston, Research Report No. 20, 1962.

This study is a doctoral thesis prepared at the Massachusetts Institute of Technology and published by the Federal Reserve Bank of Boston. The major part of the study is an analysis of wage differentials in metal working industries in the New England area. The data were gathered by questionnaires from a limited sample of firms in seven labor markets in New England. Extensive statistical tests were applied to determine the validity of the sample and the nature and significance of wage differentials among the seven markets. The survey covered 22 job classifications representative of key production, maintenance, research and development, and office and clerical activities. On the average, 46 per cent of a given firm's employees were covered by the classifications.

Inter-city wage differentials over a wider geographical area were analyzed by two different methods. The first was the "typical firm" approach. Ten typical firms were identified, varying with respect to the skill and occupational mixes required by different metalworking operations. The average hourly rates for labor for each of the ten typical firms were derived for each of the seven New England labor markets. Also, using Bureau of Labor Statistics data, the same process was applied to 26 cities throughout the nation.

The second method utilized industry and area effects. The purpose was to determine what proportion of inter-area differentials could be attributed to different industrial compositions (the "industry effect") and how much to the other factors which influence wage levels in given areas (the "area effect"). Ideally, the industry effect is related to

the demand side of the market, while the area effect relates to the supply side.

These effects were isolated as follows: average hourly earnings of all production workers in each of 61 U.S. cities were tabulated. Then an industry weighted average wage, reflecting the industrial structure, was computed for each city. This was done by tabulating the man-hours worked in each two-digit industry for each city; the distribution of man-hours in each city was multiplied by the appropriate national average hourly earnings for each industry; the sum was divided by the total man-hours worked in the city, thus giving industry-weighted average hourly earnings for each city. From this statistic the values of the area and industry effects were derived; the area effect is equal to the actual rate minus the industry weighted rate; the industry effect is equal to the industry weighted rate minus \$2.29 -- the national average hourly earnings for manufacturing production workers in June, 1960. For example:

<u>Area</u>	<u>Actual Rate</u>	<u>Ind. Wtd. Rate</u>	<u>Area Effect</u>	<u>Ind. Effect</u>
Syracuse, N.Y.	\$2.37	2.41	-.04	+.12

Within the framework of the analysis, the differences in industrial composition explained 80 per cent of the variance of actual average earnings for manufacturing production workers among cities across the country. Area effects, left as a residual, were partly explained by the relative size of labor markets, cost-of-living, and mobility considerations. So defined, area effects may include any number of present and historical factors affecting wages in different localities.