FACTORS INFLUENCING THE LEVEL OF MONEY WAGE RATES IN SAWMILLS OF THE DOUGLAS FIR REGION OF WESTERN OREGON AND WASHINGTON

by

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TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

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ARP derived from data supplied by the West Coast Lumbermen's Assoc. Average Wage Payments per Employee from West Coast Lumbermen's Assoc. Average Hourly Wage Rate from International Woodworkers of America.

LIST OF TABLES

LIST OF GRAPHS

CHAPTER I

NON-QUANTITATIVE FACTORS IN WAGE DETERMINATION PECULIAR TO THE WEST COAST SAWMILL INDUSTRY

In order to appreciate fully the forces behind changing wage rates and structures in the sawmill industry, one must understand more than the readily ascertainable physical facts and analyze more than statistical tables. Historically developed attitudes and mental quirks are impossible to measure even in a general way; even judging the direction of their influence is difficult. What, for instance, is the effect on today's wage rate of the tradition of militancy inherited from the I. W. W.; or the deep seated, in some cases almost pathological, antipathy on the part of employers toward union organizations as instruments of collective bargaining? What is the effect if on one side of the bargaining table sits a union man who still bears the mental and physical scars from beatings he received at the hands of an employer's goon squad in the great strike of 1935, and on the other sits a management representative who suffered severe losses from industrial sabotage in the strike of 1917?

The bulk of this paper will be devoted to an analysis of relationships between wages and various statistical data. In spite of this emphasis it must not be forgotten that a negotiated wage rate is the result of a complex of influences, not the least of which are the mental attitudes of the individual bargainers. In order that a balance may be preserved the author proposes to begin with a brief narrative of some of the more important non-quantitive factors which are peculiar to the determination of wage rates in the sawmill industry of western Oregon and Washington.

Until the twentieth century opened, the volume of lumber produced in the Pacific Northwest was extremely small. It satisfied the needs of the Pacific Coast states and constituted a minor item in the trans-Pacific trade, but in relation to the tremendous exploitation then taking place in the forest regions of the Lake states western lumber production was insignificant. As the third quarter of the nineteenth century progressed it became increasing apparent that the timber resources of the Great Lakes region were being rapidly exhausted, and it was then that interest in the western forests developed.[1] The coming

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[1]Vernon H. Jensen, Lumber and Labor (New York: Farrar and Rinehart, Inc.), p. 99.

of the railroads (the Northern Pacific to Portland and Tacoma in 1883, and the Great Northern to the Puget Sound area in 1893) served as the starting gun for the race to create a Northwest lumbering industry.

In the early days, labor in the logging camps, and to a lesser extent in the sawmills, was largely migratory. The "bindle stiff" who carried his blanket roll from one job to the next was typical of the laboring force. He was a "homeless, womanless, voteless" wanderer who drifted from camp to camp, wherever a job opportunity appeared. An indication of the extent of this condition was the finding of a researcher in the problems of migratory workers that as late as 1910 some ninety per cent of the laborers in the logging camps were unmarried and without any permanent address.[1] The first attempts to organize these workers (by the Knights of Labor around Eureka in 1884, and by the Shingle Weavers in 1890) were short-lived and rather futile. More successful organizing campaigns began about 1905, and it is from this date that any serious history of labor management relations must depart.

Rather than attempt even an abbreviated chronological history of labor relations, the author will try to

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[1] Carlton Parker, The Casual Laborer and Other Essays (New York: Harcourt, Brace, and Howe, 1920), p. 113.

isolate and discuss historical elements of such traditional force that today they constitute positive, if unmeasurable, factors in the determination of wages.

The Tradition of Violence

The very name of one of the unions that began organizing activities in 1905 is almost synonymous with violence. Throughout its history, and it was part of the lumber scene from 1905 to 1923, the I. W. W. was noted for the militancy of its members, and the reactions it evoked from irate employers were no less turbulent. There was a strike in the industry every year between 1905 and 1917, and these strikes were invariably shot through with bitterness and violence. When defeated in a strike, which was often, the I. W. W. cheerfully resorted to methods of industrial sabotage designed to slow down production. Clashes between "wobblies" and public officers were frequent and sometimes bloody. Free speech fights filled the jails of more than one town. On numerous occasions large bodies of strikers were forcibly deported from one area to find work and grievances in new territory. The most tragic of these clashes occurred on Armistice Day 1919 at Centralia, Washington. The so-called "Centralia Massacre" was the culmination of fourteen years of irritating friction, and

the tidal wave of public revulsion that followed it eventually wiped out the independent union movement.[1]

From 1923 to 1933 the union movement languished. No integrated, industry wide organization appeared until a group of federally chartered A. F. of L. locals banded together into the Northwest Council of Sawmill and Timber Workers Unions. In April of 1935 this aggregation accepted the jurisdiction of the International Brotherhood of Carpenters and Joiners and presented a set of uniform demands to the industry. Negotiations quickly reached a stalemate, and in May fully fifty per cent of the lumber workers "hit the bricks." The strike was an enormously complicated affair, and the memory of the direct action tactics of former days was not lost on the workers. A great many employers tried to operate behind picket lines, and violence flared at many points. In Oregon the state police were concentrated at several places to "preserve peace," but the union charged its men were beaten and driven from peaceful picket lines. There was a small but highly vociferous Communist element among the strikers, and their techniques of direct action contributed to the general tone of violence.

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[1]Standard treatments of the history of the I. W. W. are: Paul F. Brissenden, The I. W. W. (New York: Columbia University Press, 1919); John S. Gambs, The Decline of the I. W. W. (New York: Columbia University Press, 1932).

The result of the strike might be described best as a tactical defeat but a strategic victory. Few contracts were signed, and almost nowhere was the union recognized as bargaining agent. Yet the strike had revealed a genuine, widespread urge for unionization as thousands of lumber workers flocked to the standard of the S. T. W. U.[1]

If the tumultuous months of the organizing strike were considered bad, the jurisdictional disputes that wracked the industry from 1937 through 1940 were even worse. For reasons which will be suggested later, the S. T. W. U. was split down the middle in 1937 by factional strife, and an important wing joined the newly formed CIO under the name of the International Woodworkers of America. There ensued an acrimonious struggle between the two unions for control of collective bargaining rights in the industry. The most vicious kind of jurisdictional fight developed, with the public caught in the middle. Goon squads roamed the streets of Portland; the homes and automobiles of individual workers were stoned; trucks delivering supplies to mills operating under one union were wrecked by partisans of the other; the longshoremen refused to handle lumber produced in AF of L mills, and the teamsters turned down loads produced in IWA mills; in short, chaos reigned.

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[1]Jensen, op. cit. Chapter 9 gives a detailed analysis of the 1935 strike.

As time passed it became clear that neither side was going to gain a clear cut victory, and gradually the intensity of the struggle lessened. By 1940 physical clashes had become rare, and the still bitter strife came more and more to be carried on through the machinery of the National Labor Relations Board.[1]

Violence, in its more extreme forms, has not played a prominent part in the lumber scene since the early 'forties, but very important traces of it are still apparent. There is, for instance, the ready militancy of the average union member--a militancy which springs from the past necessity of fighting for any improvement in wages or working conditions. The leaders themselves, in pressing union demands, have been vigorous, determined, and confident of support from the rank and file. This militancy is still with us also in the attitudes and actions of men on both sides of the bargaining table who remember vividly, and in some cases bitterly, many of the events that have just been described. It is apparent in the form of the lack of reluctance to ask for strike action, which springs from an assurance that such a request will normally be approved and supported.

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[1] Ibid. Chapter 12 describes the jurisdictional disputes of the late 'thirties.

Rival Unionism

With the exception of a seven-year period from 1923 through 1929, dual unionism has been one of the major problems complicating labor relations in the lumber industry. At the outset the radical I. W. W. occupied the field with a conservative AF of L chartered union which was variously named and of amorphous membership. The latter had its greatest success among small, closely knit units such as the shingle weavers, while the former achieved favor among the constantly drifting men who made up the logging camp crews and the personnel of small sawmills. A drastic fall in production brought on by an I. W. W. sponsored strike in 1917 prompted the formation of the Loyal Legion of Loggers and Lumbermen, popularly known as the 4L.[1] Both labor and management were represented in the organization, and it was essentially a company union. It survived the war, and during the period from 1923 to 1929, it was the sole representative of the laboring man. It was dissolved in 1937 when the constitutionality of the National Labor Relations Act was affirmed.[2] Late in 1929 an avowed Communist organization, the National Lumber Workers Union,

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[1]The early history of the 4L may be found in: E. B. Mittelman, "The Loyal Legion of Loggers and Lumbermen," Journal of Political Economy, Vol. XXXI, No. 6 (June, 1923).

[2]Jensen, op. cit., p. 227.

attempted to recruit members, but shortly after the Northwest Council of Sawmill and Timber Workers Unions was formed, the NLWU disbanded in favor of a policy of "boring from within."

In 1936 began the great schism out of which emerged the two rival unions which exist today. The reasons why a militant faction of the Lumber and Sawmill Workers (as they are now known) chose to organize the IWA are many and complicated. Part of it, of course, was bound up in the nation-wide controversy between the AF of L and the fledgling CIO. The LSW was under the jurisdiction of the Carpenters union, and the latter was beginning to impose its ideas concerning the craft form of organization upon the lumber workers. Conditions in the industry and experience under the I. W. W. seemed to indicate that the industrial form was more suited to the needs of the lumber workers, and consequently large numbers of LSW members did not take kindly to the Carpenter advice. Another source of friction was resentment over the inferior status accorded the LSW within the Carpenters union. As a stimulant to membership the usual dues of $.75 per month collected by the Carpenters had been reduced to $.25, but the rights of the new members to pension, disability, and other benefits were abrogated. Thus the title "non-beneficial" members was hung upon them, and when it transpired that

this denied them the vote in the Carpenter conventions of 1936 and 1937, there was widespread discontent in the LSW ranks.

There was also a profound disagreement among the leaders of the LSW as to the conduct of negotiations during 1937. The recession had solidified employer opposition to any sort of concession, and the conservative element in the union was disinclined to press wage claims to the point of strike action. This disgusted and further alienated the less conservative group.

Finally, there were some grave personality difficulties. A. W. Muir, the Carpenter official who had been sent to the LSW as chief organizer and negotiator, had an imperfect grasp of the mind and temper of the lumber workers. He antagonized several of their leaders, apparently by arbitrary commands and a tendency to treat them as rank neophytes in the process of bargaining. He alienated large groups of the rank and file by advocating strike settlements which, while they may have been very realistic, were vastly disappointing to those members whose sights were set much higher.[1]

With the demise of the 4L and the rise of the IWA, the present day pattern of dual unionism took form. At

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[1]Jensen, op. cit., pp. 169, 173-74, 183.

this point an attempt should be made to assess the impact of this sort of internecine conflict on the determination of wage rates.

In the past it has been the fashion among writers in the field of labor relations to decry rival unionism. The fundamental point in their indictment has been that dual unionism inevitably fosters jurisdictional strife and thus is subject to all the evils and mischiefs associated with that type of rivalry. As regards the particular subject of wages, it has been assumed that several aspects of interunion competition would have depressive tendencies. For instance, the bickering and discord would tend to destroy union solidarity, and offer an opportunity for the employer to play one group off against the other. In addition, in their zeal to acquire a larger membership at the expense of the opposing organization, one union might make concessions to employers in order to enlist their support. Or a striking union might find its position being undermined by its rival in the hope of fatally weakening it; it might even find rival members "scabbing" behind their picket lines.

More recently a theory has been propounded that suggests these effects, insofar as they are valid observations, are the more likely result of an early and immature type of rivalry. It further suggests, that as it becomes

apparent that neither union is going to exterminate the other, a "mature" form of rivalry may develop. At this stage each union accepts the other as a more or less permanent fixture, and from this mature relationship some positive good may arise.[1] In line with this theory, one author has intimated that one of the beneficial results of the competitive compulsion to outdo each other may be the establishment of wage rates that are higher than they otherwise would have been.[2]

If this theory is applied to the concrete case of the lumber industry since 1937, there seems to be considerable evidence to support it. The period from 1937 to 1940 was indeed enough to confirm the worst fears about the evil effects of dual unionism. Since 1940, however, two significant trends seem to indicate the development of a new form of rivalry. First, the adversaries have come increasingly to rely on the machinery of the NLRB to settle representation disputes, and less and less upon

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[1]See, for example: David J. Saposs, Dual Unionism (New York: The Macmillan Co., 1931), p. 261; Clyde E. Dankert, Contemporary Unionism in the United States (New York: Prentice-Hall, Inc., 1948), p. 96; Foster R. Dulles, Labor in America (New York: Thomas Y. Crowell Co., 1949), p. 310.

[2]Arthur M. Ross, Trade Union Wage Policy (Berkeley: University of California Press, 1948), p. 68. Charles E. Lindblom, Unions and Capitalism (New Haven: Yale University Press, 1949), p. 47.

boycott and jurisdictional picketing. Second, the emphasis on the drive for members has been shifted from the raiding of rival locals to attempts to organize the unorganized. For instance, during 1947 and 1948 the NLRB conducted one hundred and forty-one representation elections involving either the LSW or the IWA or both. In one hundred and eleven of the cases, or almost 80 per cent, one union alone appeared on the ballot, while in only five cases, or less than 3 per cent, was one union petitioning for an election in a unit in which the other was party to a contract.

There is also some evidence for the assertion that inter-union competition tends to raise wage levels. Twice in the postwar period the union making the initial settlement saw the pattern broken and its rival granted a larger wage concession. In both cases the union with the smaller settlement (in 1945 it was the IWA; and in 1948 it was the LSW) demanded, and immediately received, the differential. Thus, in at least two suggestive instances, it is fair to say that rival unionism has resulted in a wage higher than would have been obtained had the union settling first been the only one in the field.

Suspicion Concerning the Motives of Employer Organizations

A third strong tradition among the lumber workers is a long standing mistrust of the motives of employers' organizations. The employers have been an inordinately

individualistic group, and their resistance to union recognition has been of almost legendary proportions. To this day a great many individual owners refuse even to belong to an association which negotiates with a union, though they cheerfully and promptly grant their employees every pattern wage increase. In the early days this attitude was made manifest by the formation of employer groups designed not for purposes of collective bargaining, but primarily for wholesale resistance to union encroachments. Notable among these groups were the Lumbermen's Protective Association, organized in 1917, and the Employer's Clearing House, formed in 1923. The original purpose of the former was to present a solid front of opposition to the great strike of 1917; while one of the major activities of the latter appears to have been the blacklisting of union men. In addition to industry wide organizations such as these, local groups of employers have frequently banded together to cope with more parochial problems. Their chief function has been to raise sizeable slush funds for the purpose of protecting "any contributing manufacturer involved in labor troubles and to provide the mills with workmen."[1]

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[1]Jensen, op. cit., p. 118.

Even the 4L was a source of disillusionment and eventual distrust, for such was the structure of the organization that the relative bargaining power of labor and management was far from equal. The association was, of course, voluntary and any employer was free to resign when he saw fit. The unusual part, however, was that the resignation of an employer meant the automatic withdrawal of his employees from the association. Thus any time an employer was dissatisfied with a settlement--i.e., any time labor received a substantial concession at the bargaining table--he was free to nullify it unilaterally by withdrawing himself and his whole crew from the organization.

It must be pointed out that this distrust has not been one sided. Apart from an almost instinctive and very virulent aversion to unions, the employer has found other more rational bases for distrust. He often has felt, sometimes with justice, that he is the innocent bystander who is invariably injured by jurisdictional disputes. At times agreement with one union has meant a full treatment, with boycott and picket line, at the hands of the other. The average employer also carries with him a half-century-old suspicion that, whatever may be the case nationally, this particular section of the union movement is dominated by radical and/or Communist forces. Typical of this attitude was the comment of F. H. Ransom, president

of the Eastern and Western Lumber Co. of Portland, during the 1935 strike. He placed the blame for the strike on "outside interests. If the lumbermen and their employees, who have always been able to adjust their differences in the past, could be left alone, everyone would be back to work and happy."[1] All questions of the justice or validity of the assumption aside, this sort of feeling was and is a factor with which to reckon. It has undoubtedly bolstered the moral foundation of his case in the mind of many an employer, and in this way increased his bargaining strength.

In a similar way, the lingering suspicion of the laboring man that the ultimate purpose of any employer's organization is opposition rather than negotiation, has made him less inclined to bargain than to demand, and has made him reluctant to accept less than the maximum he feels the employer can pay. One of the major problems facing responsible leadership in the two unions--no less than that facing the employers--is the elimination of this mutual suspicion and the establishment of a basis for mature bargaining.

The question of the effect on wages of these considerations is even more complex and obscure than in the case of those discussed previously. It involves

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[1] Seattle Post-Intelligencer, June 27, 1935.

balancing one result off against the other in a process that deals almost entirely in psychological attitudes and quasi-moral imperatives. Rather than traffic in pure guesswork unrelieved by landmarks it may be sufficient merely to have pointed out the condition.

The author believes these are the most important non-quantifiable elements peculiar to wage determination in the western lumber industry. The remainder of the paper will be an attempt to relate wage rates to a number of other data, but whatever conclusions may be drawn from statistical material, the author wishes the foregoing to stand as a reminder of the judgmental factors involved in wage determination.

CHAPTER II

STANDARD WAGE MEASURES

Throughout this paper two standard measures of wages will be used as dependent variables in graphic and statistical comparisons with various other magnitudes and schedules. In order to save explanation later these two measures will be described here.

Average Hourly Wage Rates

The average hourly wage rate per employee during each of the sixty-four quarters under consideration was obtained from the files of the national office of the International Woodworkers of America. From the time of its official activation in 1937, this union has represented approximately 50 per cent of the organized production workers in the Douglas Fir region. In spite of this restricted coverage the writer feels that for several reasons these figures are a good approximation of the actual rates obtained throughout the fir region. In the first place, the wage settlements reached by the I. W. A. and its rival, the Carpenter affiliated Lumber and Sawmill Workers, have been identical in all cases but one. Almost invariably when wage settlements have been reached at

different calendar times, the later award has been made retroactive to the date of the original agreement.[1] The single exception occurred in 1950 when the I. W. A. negotiated an employer financed health and welfare plan in lieu of a wage increase. Even in this case, however, the computed money value of the plan was equivalent to the money wage increase received by the L. S. W. In the second place, the number of non-union employees in this region is small in relation to total sawmill employment. In addition it has long been the custom of employers of non-affiliated labor to pay any pattern settlement widely granted throughout the industry.

Fluctuations in the average hourly wage rate series will arise from three general sources. The major cause of variation is the negotiated wage rate, which is normally subject to revision annually in April or May. However, in times of rapidly rising consumer prices, employers occasionally have consented to a reopening clause at less than annual intervals.[2]

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[1] See Chapter I, above.

[2] For example, wage increases were granted in April and December of 1942; November and December of 1945; April and December of 1946; and May and September of 1950. See Appendix "A".

A secondary, and much less important, cause is the change in the relative number of workers in each rated job. For example, a relative decline in the number of sawyers vis a vis the number of green chain men would cause a small reduction in the average hourly rate because of the different rates of pay applicable to the two jobs.

A third source of fluctuation arises from the ability of the employer to vary the amount of overtime work he offers and the number of shifts that are operated. A change of overtime hours, which are compensated at a penalty rate of time and one-half, or a change in the number of shifts, which are compensated at differential rates, will cause changes in the average rate per employee. It should be pointed out that there is an absolute limitation on the degree to which the hourly rate can be increased by this device. During times of full employment of the available labor force there is some point at which a further increase in the number of overtime hours per employee is impossible without endangering the health and welfare of the workers. At this point discretionary changes in the hourly rate by use of the device of varying overtime are confined to the downward direction.

The average hourly wage figure is quite rigid over periods ranging up to a year. The possibilities inherent in the means available to employers for varying it without

union-management negotiations are very strictly limited. Varying the proportions of a work force cannot go beyond the point at which the product flow becomes distorted, while, as has been suggested above, changes in overtime offerings are only a one-edged weapon in times of full employment such as characterized most of the interval 1937 to 1952. The comparative ineffectiveness of these measures may best be seen by noting the changes in average hourly rates between contract revisions. The greatest of these changes occurred between 1951 and 1952; it amounted to a dollar increase of $.094 per hour and a percentage increase of about 4 per cent. The largest reduction in rates was effected between the contracts of 1943 and 1945; in dollar terms it was $.03 per hour and was about 2 1/2 per cent.[1] These were the extreme variations, and in most cases the percentage changes were considerably less than one per cent.

Average Quarterly Wage Payment Per Employee

The measure of average quarterly wage payment per employee was lifted almost bodily from Employment Statistics, a monthly publication of the West Coast Lumbermen's Association. This association compiles its data from

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[1]See Appendix "B" on this point.

current reports from millsites representing percentages of total Douglas Fir production ranging from 45 to 65 per cent in the period under discussion. The data collected by the W. C. L. A. are generally recognized as the most accurate material available on the logging and sawmill industries of western Oregon and Washington.[1]

There are three variables which affect the average payments series. One is the average number of men working during each period; a second is the average number of hours worked per employee during each period; and a third is the average hourly wage rate. The statisticians of the W. C. L. A. computed the average payments figure in the following manner. They multiplied the first variable times the second to obtain total man-hours worked. This figure in turn was multiplied by the third variable to get the total wage bill. Finally, the wage bill was divided by the average number of men employed to obtain average payment per employee.[2] Because of the method of computation this series is not a measure of take home pay, but rather

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[1]These data are used by both the Bureau of Labor Statistics and the Department of Commerce as well as by various other governmental agencies on both a state and federal level. Among other things production, new order, employment and payroll figures are accepted as the best available indicators.

[2]Industrial Facts Department, The West Coast Lumbermen's Association, Employment Statistics (Portland, Oregon).

an indication of the average payroll check prior to deductions for income tax, federal insurance contributions, and the health and welfare plan.

Theoretically this criterion of wages should be somewhat more flexible than the average hourly rate. Not only is it possible to vary the number of employees, but it is comparatively easy to change the hours worked per employee. Of course, there are rather rigid upper limits to both of these possibilities; the former set by the available labor force, and the latter by customary and contractual limits on daily and weekly hours. These limitations constitute a serious check to the flexibility of average payments when the period under consideration is a time of full employment and continued high demand. Under these conditions there is unlikely to be any serious tendency toward reduction of any of the variables determining average payments. In any event, the conclusion seems warranted that during certain periods the alleged flexibility of this type of wage measure may be operative in a downward direction only.

CHAPTER III

MONEY WAGE RATES AND THE MARGINAL PRODUCTIVITY THEORY

In this chapter an attempt will be made to apply the marginal productivity theory of wages to the determination of money wage rates in the sawmill industry of western Oregon and Washington.

The marginal productivity theory of wages[1] rests on two major premises: that the "law of eventually diminishing marginal returns" is universally valid, and that the prime ingredient in business decisions is the motive of profit maximization. The former states that when a factor of production is applied in increasing amounts to other factors of production, the latter remaining fixed, a point will be reached after which output will be increased less than proportionally to the expanding factor. From this it can be deduced that the value of the product of each succeeding unit of factor will be less than that of the preceding unit after the point of diminishing returns has been reached. If there exists an imperfect input market the decrease in value occasioned by the fall in

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[1]The marginal productivity theory of wages is, of course, only one aspect of a general theory of distribution.

marginal physical product is reinforced by the necessity of higher money payments to secure additional units of factor. Thus may be defined a concept called the marginal value product. It is the increase in total revenue brought about by the addition of one more unit of factor.

The second building block--profit maximization--defines how management will react in choosing employment levels. Under this assumption the employer will hire that amount of labor which just equates the wage rate and the marginal value product. If he employs fewer men, profits would be less than a maximum because the MVP of the marginal worker would be greater than the wage rate. If he employs a larger number of men, profits would again be less than a maximum because wage costs would be greater than the return from the marginal worker.

In summary then, the theory is simply this. At least within groups of workers of a given class or type, that wage rate will prevail (or that number of workers will be employed) which is equal to the increase in revenue attributable to the marginal worker. The marginal value product of labor may be affected by several factors. Because they alter the average productivity of labor, changes in the capital-labor ratio will cause changes in MVP. Changes in demand schedules may cause fluctuations in MVP in two ways. Ceteris paribus, a change in demand

will cause a price movement in the same direction, thereby altering the MVP through the resultant changes in the revenue schedules. Alternatively, an employer in an imperfectly competitive industry may choose to have the change in demand reflected in production changes. In this case, the MVP will be affected through changes in employment. A third factor is the cost structure of the firm: through its effect on production levels, and thus employment, this item can also cause changes in the MVP.

The marginal productivity theory holds that the employer will be forced by competition and impelled by his desire to maximize profits, to maintain some sort of a running evaluation of the value to him of his labor force. This evaluation will become most precise and critical at times when he contemplates an expansion of his capital facilities. It is assumed that through this process of evaluation the employer will adjust the size of his labor force to magnitudes optimum for his economic benefit. In so doing he will bring about, probably unconsciously, a correspondence between the wage rate he pays and the MVP. Thus, wage rates which the employer feels are excessive will cause him to reduce employment, and <u>vice versa</u>, because in this way his best economic interests will be served.

In order to render the formulation theoretically precise, a number of explicit assumptions are necessary. Among the more important of these are: (1) Perfect competition must prevail in both the input and output markets; (2) The only important motive which impels business decisions must be that of profit maximization; (3) There must be an approximately identifiable relationship between work performed and physical production; (4) Approximately full employment must prevail over long periods of time; (5) Price and wage flexibility must be sufficient over time to insure that markets will be cleared and an equilibrium maintained; (6) Demand and supply schedules and production functions must be stable over considerable periods of time. Presently the author shall examine and comment upon these assumptions, but first the reader must permit a short digression.

One of the most difficult problems in discussing the marginal productivity theory arises from the fact that authorities differ widely in their opinions as to what phenomena the theory is competent to explain.

Marginal Productivity as a Determinant of Short Run Wage Rates in the Firm

In many principles and intermediate theory texts the marginal productivity theory is presented as the

explanation of the demand of a firm for variable inputs. A typical example appears in an economic theory text by Kenneth Boulding.[1] Assuming that all other factors remain constant, the price (wage) of labor is determined by its marginal value product. On Graph I below, labor in terms of man-hours is on the horizontal axis, and the hourly wage rate is on the vertical axis. The curve AB is the marginal value product per man-hour. The downward slope of the curve after point M indicates that diminishing marginal returns have set in. Then, for any quantity of labor employed, the wage rate must be equal to the marginal value product of the last increment. On Graph I if the quantity of labor which is employed is OQ the MVP of the last unit will be QN, and consequently the wage rate must be OP (or QN).

If, for any reason, wage rates should rise above the competitive level it is assumed that the employer will lay off men until the MVP is again equal to the wage rate. It is assumed further that the workers who are dispossessed from their jobs because of "excessive" wage rates will offer labor services at reduced prices, and that their competition in the job market will cause wages to be lowered until the optimum employment level is reached.

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[1]Kenneth Boulding, Economic Analysis (New York: Harper and Bros., 1948), pp. 705-7.

Thus, in this view, unemployment is a short run phenomenon which lasts only as long as is required for the ineluctable forces of the free market to restore equilibrium.

In this form the theory has three qualities which largely explain its popularity. It is precisely determinate: that is, given the relevant schedules the theory answers with a charming exactitude all wage-employment-income questions. It is automatic: that is, given perfect competition it is not only undesirable, it is literally impossible for anyone to depart for long from the plainly marked paths. It is morally satisfying: that is, the theory explains not only what the wage <u>will</u> be, but also what it <u>should</u> be. The wage earner is entitled to the value of the marginal product--no more and no less.

Few economists advance this formulation as more than a convenient over-simplification. The demonstrated rigidity of factor and commodity prices; the institutionalization of the job market and government intervention in the form of minimum wage laws and unemployment compensation; and the fact that most critical valuations of factors are made only infrequently when new plant or major technological changes are contemplated; all these objections have led most economists to some alternative expression of the theory.

Marginal Productivity as a Normative Value

As one alternative to the foregoing construct some economists have fallen back on the normative or ethical aspect of the theory.[1] It is admitted that through trade union pressure, or minimum wage laws, or unemployment compensation, wage rates may exceed MVP for relatively long periods of time. However, such a departure from "normal" conditions can be attained only at great cost, both to the worker and the economy as a whole. At times even J. R. Hicks seems to share this attitude. For example, he says, "In normal circumstances wage rates are determined by competition on both sides."[2] Even when Hicks discusses the effects of less than perfectly competitive input markets his conclusions make it clear that the wage rates which will be set are in some sense abnormal rates. The inevitable result of maintaining such rates is a prolonged hard core of unemployment and a gradual destruction of real capital.[3]

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[1]See for example: Henry C. Simons, Economic Policy for a Free Society (Chicago: University of Chicago Press, 1948). See Chapter I. Also, Charles E. Lindblom, Unions and Capitalism (New Haven: Yale University Press, 1949).

[2]J. R. Hicks, The Theory of Wages (New York: The Macmillan Co., 1932), p. 61. Author's italics.

[3]Ibid. See especially Chapters VIII, IX, and X.

To this group of economists marginal productivity is somehow an expression of things as they "ought to be;" an inflexible guide to policy, any departure from which involves the indiscriminate sowing of dragon's teeth. It is typical of this group that both collective bargaining and government wage legislation are opposed on principle; the principle being that such action is a violation of a natural law which is definable in terms of marginal productivity.

Marginal Productivity as a Long Run Determinant of Wage Rates

The most defensible version of the marginal productivity theory is one which emphasizes the long run nature of the theory. In this connection Paul Douglas has said, "No one who understands the marginal productivity theory claims that it works with mathematical precision. It is enough that it is a broad and powerful tendency which brings wages into some sort of close conformity to it."[1]

In the same vein Hicks argues that imperfections in the market will tend to cause lags of various sorts and durations between changes in marginal value product and changes in employment. The principle reason for these lags lies in the imperfect mobility of capital and the

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[1]Paul H. Douglas, The Theory of Wages (New York: The Macmillan Co., 1934), p. 77.

consequent necessity of waiting until the accumulation of depreciation allowances makes the varying of the capital-labor ratio feasible.[1]

This form of the theory obviates many of the objections which may be raised against the preceding versions. For instance, the lack of homogeneity in the labor force cannot be a cogent objection; for if one is no longer attempting to arrive at a mathematically precise answer the fact that a mans' labor cannot be parceled out in infinitely small discrete packages is a matter of indifference. Neither is the imperfect mobility of the laboring man a serious objection in the long run. As the time period expands this difficulty tends to disappear and whole population movements are possible. Even more important, in the long run concept it is possible to abandon the fiction that profit maximization consists in a comparison of the money receipts of today and tomorrow. In the long run it is eminently proper to ascribe some of current costs to future production; i.e., part of the productivity for which a company is currently paying may be for future product--to be produced conceivably by a completely different set of workers. This recognition that the MVP cannot always be quantified in dollar terms fortunately

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[1]Hicks, op. cit., pp. 18-19.

has led to the introduction of subjective elements into the calculation of marginal value product.[1] It has been contended that MVP is a concept which often may exist only in the mind of the individual employer. In such a case it is whatever the employer believes it to be, and wage rates and employment will be set at that level which he thinks will maximize his return in the long run. The things which enter into the employer's interpretation of MVP are many and varied, and by no means do they all revolve around immediate money return. Considerations such as long term labor peace, consumer reaction to publicized wage policies, employee welfare, the desire of a monopolist to forestall incipient competition, etc. may all influence the calculation of the value product which management feels it derives from the marginal worker.

Of course this version of marginal productivity robs the pure theory of three of its most prized qualities. First, it destroys that confidence inspiring determinacy which has made its adherents so tenacious in defending it. It cannot now be argued that any given wage rate is "excessive" and necessarily will result in unemployment, because the MVP is subjectively determined by management. This

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[1] An excellent discussion of this subject may be found in: Fritz Machlup, "Marginal Analysis and Empirical Research," The American Economic Review, Vol. XXXVI, pp. 519-54.

means that there is no objective standard by comparison with which a wage may be declared normal or abnormal, and any particular rate is perfectly consistent with the theory so long as the employer believes that rate to correspond to the value product of the marginal worker.

Second, this form of the theory deprives it of the ethical aspect which has been another key to its great popularity. It is no longer possible to say what the rate "ought" to be, but merely what it, as a matter of fact, has turned out to be.

Finally, if subjective elements are admitted in court, the connection between wage theory and the rest of the price system will be loosened. The whole magnificent edifice of a self-equilibrating general equilibrium based upon the marginal analysis will be badly upset by the indeterminacy of wage rates. The allocation of resources among competing ends can no longer be described in definitive terms; and the levels of employment and income attain a flexibility, even under static conditions, which they cannot have under the older form of the theory.

Thus, as one writer has said:

> A once respected theory is covered with the shame that it is no longer susceptible to meaningful verification as descriptively valid, or even to meaningful application as a norm. It becomes little more than another way of stating the maximizing principle as it applies in a particular aspect of economic life. . . . It becomes a restatement of one of the <u>assumptions</u> on

> which the older theory was based. . . . There is no longer the possibility of predicting or judging the consequences. . . . in terms of the wage rate, employment, or the allocation of the labor force.[1]

It is not reasonable to presume that a theoretical construct of this kind is a close description of the actual distribution of income. Its usefulness lies in other directions. What it does do is point a significant finger at the underlying forces that shape and mold incomes. It can describe quite accurately many of the basic motives which impel the critical business decisions. While it cannot be accepted as the definitive guide to public policy or a complete description of private actions, it is still a very useful vantage point from which policy decisions may be made and private actions analyzed. Any theory is an abstraction from reality: its usefulness depends very much on how close an approximation it is to the real world. The time has come now to examine critically some of the important assumptions upon which the marginal productivity theory rests.

Some Assumptions Underlying the Marginal Productivity Theory

Many economists have assumed that, in order for the marginal productivity theory to work smoothly and/or

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[1]Neil W. Chamberlain, Collective Bargaining (New York: McGraw-Hill Book Co., 1951), p. 345.

produce "normal" results, perfect competition must prevail in both product and factor markets.[1] This is so (they argue) because competition is the compulsive element in the marginal analysis. E.g., any firm which consistently overestimates the marginal value product will be forced from business (or will drastically curtail its output) because of its high cost operation. If one attempts to incorporate monopoly elements into the theory it must be recognized that, while this improves the theory from the standpoint of realism, it also means that the "conform or die" feature has been removed. This certainly does not imply that competition is not now a force in guiding the behavior of firms even in industries characterized by oligopoly conditions. What it does imply is that the literal necessity of setting employment levels at the point where wage rate and MVP are equated has been eliminated, and that a range of discretion has been opened up so that, within limits, employers may be said to have a wage or price policy. Thus it can be said that if the marginal

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[1]This was one of the assumptions of the foremost neo-classical exponent of the theory, J. B. Clark, in Essentials of Economic Theory (New York: The Macmillan Co., 1907), p. 132. It is also stipulated by Hicks, op. cit., p. 61. It appears almost invariably in principles and theory texts and the citations in that field would be innumerable.

productivity theory is modified to accommodate monopoly conditions it must sacrifice some of its determinancy and all of the ineluctable necessity which it attributes to certain business decisions.

A second assumption which should be examined is that the motive of profit maximization is the only important factor in making business decisions. It has been seen that the excessively narrow view that profit maximization must be expressed only in pecuniary terms is not necessary to an adequate expression of the marginal productivity theory in the long run. Many subjective considerations are also admissible. There is, however, a certain residue of objection to a theory which assumes all decisions are postulated on some ultimate expectation of profit. There is, for instance, the distinct possibility that management may deliberately expand employment and production beyond the most profitable point through a desire for the power and prestige which our society accords to importance (and often mere bigness) in the industrial community. The desire to maintain a traditional leadership status within an industry may lead to the same thing. It is no less possible that management may deliberately hold employment and production at less than the most profitable magnitudes. If expansion involves managerial effort which imposes distasteful work or time restrictions, and if profits are

adequate to satisfy stockholders, the businessman may very well choose to employ less than the optimum number of factors.

Another objection to accepting even a broadly defined version of profit maximization as the only important business motivation arises from the difficulty of tracing an even approximately direct relation between the work effort of many types of employees and the physical product therefrom. This difficulty is least stringent, but by no means absent, where production workers are involved. It is a very serious one where administrative or service personnel are dealt with. For example, in building maintenance work the economic basis for the employment of janitors may be grounded in the increased efficiency that might be expected to spring from a plant kept clear of obstructive debris and a clean and pleasant work place for the production employees. But beyond some indefinable minimum requirement in this respect the management of similar plants may vary widely in the size of their building maintenance forces. The larger force may be the result simply of the difference in some subjective standard of cleanliness entertained by the two managers. In this case at least some part of the larger work force bears no direct relation to the wage rate or the MVP. Similarly a public

relations department may exist in the first instance as a device for creating good will and thereby increasing profit expectations. But a particular employer may greatly enlarge this department for the secondary purpose of enhancing his own prestige by spreading the fame of his company far beyond its market area. Again, some of the employment in the department in question will be largely unrelated to the MVP. The same observations could apply equally well to almost all the service departments in any large business.

The human being is notoriously deaf to the dictates of logic. The principle of profit maximization implies that, in his business relations, man will act in a highly predictable manner, defined by what he considers to be in his best economic interests. It is the contention of the author that, if man pleases, he is quite capable of ignoring these interests. Certainly the profit motive is a powerful one; remove it and economic analysis would be a chaos. On the other hand, the author believes that if the motive is relied on, completely serious, though perhaps not fatal, errors will arise in attempting to describe economic phenomena. In making this abstraction (i.e., in ignoring non-pecuniary motivations) the marginal productivity theory certainly lays itself open to a certain amount of error.

A more serious defect of the theory is the assumption that full employment prevails more or less continuously. Paul Douglas has said:

> One of the most remarkable features about the work of both the classical and neo-classical schools has been their failure to recognise the possibility of unemployment. . . . The productivity theorists and the neo-classical school have treated unemployment as resulting solely from the attempt by labor to secure a higher wage than their product at the margin, and as only operating as the mechanism by which workers demands were forced down to the point where the employers would be justified in hiring them. . . . Whatever, therefore, may be the condition in the real world of affairs, the productivity theory is based on the assumption that there is work for all, and that all who really want work and are able to perform it and who are willing to work for the marginal wage are employed. Thus the marginal productivity of labor is made identical with the marginal productivity of employed labor.[1]

If unemployment persists over long periods of time the marginal productivity theory will be woefully inadequate to explain much of wage phenomena. In a period of full employment presumably no employer could pay a worker less than the MVP for a very long period of time, because the worker may freely avail himself of alternative job opportunities. What most productivity theorists seem to have overlooked is the possibility that in periods of prolonged unemployment workers may freely offer their services for less than the marginal value product on the rather pathetic

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[1]Douglas, op. cit., pp. 70-71.

grounds that any job is better than none. With no automatic corrective tendency such as is assumed in the theory available on the practical level, it may well come to pass that the employer will be able to pay wages which are consistently less than the MVP.

An even more fundamental defect of the theory in periods of severe unemployment is that the law of diminishing returns does not strictly apply. A depression of considerable magnitude is typically accompanied by a large degree of unused plant capacity. Because of this pool of unused capital it does not necessarily follow that the marginal physical product of each new increment of workers will fall: over a long range of the production schedule the MVP may remain fairly stable regardless of the number of workers employed. This erects a range of indeterminacy in which employment levels will not be defined by the conjunction of MVP and the wage rate, but by the amount of product which the market will absorb. The length of this band of indeterminacy is the measure of how imperfectly the marginal productivity theory will describe the situation.

This abstraction is a serious one. It means that the theory is only a one edged sword: for those periods in which unemployment is significant the theory cannot be said to even approximately describe the real process of

split unions

wage determination. The only unemployment policy which can be legitimately deduced from the theory is a general wage reduction designed to equalize the "abnormally" high wage rate and the hypothetically low marginal value product.

Another necessary assumption of the theory is that, at least in the long run, prices will be flexible enough so that they will respond to changes in supply and demand conditions. If one element in the distribution analysis fails to adjust in the prescribed manner (at least after an appropriate lag) it can be expected that all other magnitudes associated with this analysis will be affected also.

In the case of the sawmill industry it can be shown that, for the period 1937-1952, this condition of price flexibility did not continuously hold. If the reader will compare Appendix "E" and Appendix "H" he will note that from the fourth quarter of 1939 through 1952 the amount demanded (as measured by unfilled orders)[1] at all times exceeded the amount supplied (as measured by shipments). Nor does it appear that this is a static condition normal to the industry, for the reader will also note very large non-seasonal fluctuations in the size of the unfilled orders series. Thus over a period of more

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[1]For a definition and discussion of unfilled orders, see Chapter VI, below.

than thirteen years the market was not effectively cleared. It follows that both employment and production were smaller than they would have been had the market mechanism worked with even approximate accuracy. It follows further that the wage rate was not necessarily determined by the principle of marginal productivity. The rate could easily have been above competitive levels without the employers making any move to secure adjustments through changing the levels of employment.

The most restrictive of the assumptions upon which the marginal productivity theory is based is that of a static equilibrium. It is postulated that demand and supply schedules and production functions are constant at least over long periods of time.[1] The unreality of this assumption is hardly open to question. Any attempt to describe the dynamic economy of the United States in terms of fixed technical processes, invariant demand functions, a constant supply of capital, and unchanging institutional forms is fanciful in the extreme. If a model of this type is used to describe wage behavior in the intensely real setting of a modern industry, some truly remarkable errors are bound to occur. If there is

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[1]These are some of the static conditions set forth by Clark, op. cit., pp. 132-33.

a pronounced secular expansion "excessive" wages may have little effect on the volume of employment, or if unemployment should appear in a particular area the idle workers who should be bidding down the price of labor instead may be absorbed in the burgeoning industrial expansion in other areas. Cyclical expansion with its rapidly increasing demand, or the introduction of radical innovations may lead to similar results. A dynamic economy has myriad pitfalls for one who attempts to describe the real pricing process primarily in terms of the marginal productivity theory.

In recent years some economists have attempted to mitigate this deficiency by introducing a sort of dynamic equilibrium in which the capital and labor supplies are assumed to be expanding or contracting at constant and/or divergent rates. But even this modification ignores the fundamental characteristic of American industry in the last eighty years. The secular expansion has been anything but orderly. Rather it has been a discontinuous and often explosive extrusion of new products, new ideas, new forms of organization, new uses for old products--in short, that process which Schumpeter has so aptly described as "creative destruction."[1]

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[1]Joseph A. Schumpeter, Capitalism, Socialism, and Democracy (New York: Harper and Bros., 1950), pp. 81-86.

Conclusions

Six of the major assumptions of the marginal productivity theory have been examined above. The author has expressed more or less serious objections to each of them on the basis of their lack of correspondence to the real world. In the case of the first two (perfect competition and profit maximization) the defects pointed out were not of capital importance: rather they were an attempt to force recognition of some significantly large exceptions to the general rules of marginal productivity. The last three of the assumptions, however, were found to be far out of step with the realities of a modern industrial economy. Any attempt to describe the process of income distribution only in terms of the marginal productivity theory will encounter distortions, contradictions, and manifest misconceptions. Only under very special circumstances, and then only for short periods of time, will the main assumptions of the theory be reflected in actual conditions in the economy. As a consequence, it is the opinion of the writer that the chief value of the marginal productivity theory lies in its use as a conceptual tool. Its prime function will be as a prototypical framework within which the forces at work may be ranged in perspective, and as a touchstone from which all speculation must proceed.

Marginal Productivity and the Sawmill Industry

There may be some value in attempting to apply the marginal productivity theory in explaining fluctuations in wage rates in the sawmill industry of the Douglas Fir region. At the outset it must be admitted that any attempt to apply the theory to an actually existing industry will be a crude one. Many of the specific assumptions underlying the theory must be ignored in this analysis. For example, during the sixteen years under consideration (1937-1952) there were very wide fluctuations in demand, production functions were substantially altered by the introduction of several innovations, and there probably were large fluctuations in supply schedules as there was a great war and post-war proliferation of the so-called "gyppo" operators.[1] Very obviously these happenings do great violence to the static conditions assumed by the theory. As another example, the evidence for an indeterminate amount of price

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[1]A "gyppo" operator is an industry term which denotes a mill owner who is operating on the barest minimum investment in the smallest possible amount of equipment, which is usually used and often misused. These people swarm in and out of the industry in response to any prolonged change in demand conditions. In periods of prevailing high prices there will be literally hundreds of them in the industry. In spite of their numbers they, as a whole, seldom produce a significant amount of the total industry output.

rigidity has already been adduced earlier in this chapter. The institutionalization of the labor market[1] suggests that wage rigidities were also present.

These and other conditions make it probable that, in the case of a dynamic industry, the theory will produce results that are distortions of reality. In order to obtain some indication of the extent of this distortion the writer proposes to examine certain statistical material and compare the theoretical with actual results.

Method of Analysis

Graph II was constructed to provide a visual demonstration of the degree of correspondence between movements of wage rates and marginal revenue productivity. It contains the average hourly wage rate series and a series showing the marginal value product during the period 1937-1952. The latter was obtained by dividing changes in total revenue from one quarter to the next by changes in man-hours worked. In this formulation the MVP represents the value in dollars of the marginal product of a man-hour of labor.[2] A second approach to the problem makes use of

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[1]Seven employer associations and two labor unions represent the labor and management combination that manufactures over 80 per cent of the Douglas Fir cut.

[2]Since actual employment and production figures are not conveniently arranged in one unit increases, the MVP figures here used are really the average value product of a varying number of marginal man-hours.

Table I to illustrate in absolute figures the changes and relations in the variables discussed. With the aid of this Table the extent to which marginal value product has set the wage pattern can be observed by comparing the MVP data with the wage rate which it presumably determines.

Finally, a group of linear correlations was computed to gain a more precise indication of the extent of co-variation between the marginal value product and wage rates.

Results

In interpreting the results of these comparisons several restrictive qualifications must be recognized. First, in comparing the MVP only with wage rates the writer has acted, in effect, as if labor were the only variable cost. In point of fact this is not so: logs and log prices are an important short run variable cost. As a minimum condition this cost should be included with labor costs when the latter are compared with MVP. Unfortunately the author has been unable to find an adequate price or price index series for Douglas Fir logs. As a consequence the comparisons made here are not so accurate as they might be. Second, the restriction imposed by the static assumptions of the theory has already been noted. The period under study was one of constantly and often rapidly shifting demand. Consequently, in this analysis

much of the fluctuation in MVP is attributable to price rather than productivity or employment changes. Finally, the marginal productivity theory is a firm concept, but since the only available data are cast in industry terms the writer has been constrained to so present it.

It is clear from Graph II that short run movements of wage rates were frequently in direct opposition to short term variations in MVP. This is readily confirmed by the simple process of comparing the turning points in the MVP curve with those in the wage rate curve and noting that, as often as not, the movements run counter to each other.

Table I provides the absolute data upon which Graph II is based. The conspicuous lack of correspondence between the movements of the several variables is reflected, of course, in this tabular series as well as in the graphic form. Several other interesting features are contained in the table. (1) The range in the fluctuations of MVP is very wide. The low point is a negative $244.99, while the highest figure is $870.58. Such extremes are partially explainable by existing industry practices. For example, some of the negative figures for marginal value product are undoubtedly the result of a custom by which sawmill crews are employed on firelines during severe forest fires on private lands. In such cases it is customary for the

TABLE I

MARGINAL REVENUE PRODUCT AND AVERAGE HOURLY WAGE RATES IN SAWMILLS OF WESTERN OREGON AND WASHINGTON

1937-1952

Year	Quarter	Marginal Revenue Product	Average Hourly Wage Rate
1937	1	-	$0.659
	2	$ 7.45	.726
	3	13.45	.727
	4	5.26	.729
1938	1	9.28	.728
	2	1.14	.725
	3	4.20	.721
	4	- .58	.727
1939	1	-245.99	.723
	2	4.45	.724
	3	5.90	.726
	4	124.05	.726
1940	1	- 4.75	.733
	2	- 14.99	.733
	3	16.88	.734
	4	- 72.23	.765
1941	1	92.27	.791
	2	- 7.58	.845
	3	17.74	.874
	4	- 3.17	.874
1942	1	13.48	.881
	2	9.54	.959
	3	38.68	1.033
	4	2.58	1.065
1943	1	7.84	1.093
	2	18.91	1.141
	3	13.05	1.127
	4	15.13	1.126

TABLE I (CONT'D.)

Year	Quarter	Marginal Revenue Product	Average Hourly Wage Rate
1944	1	$ 1.81	$1.120
	2	1.14	1.140
	3	7.98	1.170
	4	6.16	1.150
1945	1	-206.04	1.140
	2	9.44	1.150
	3	10.70	1.170
	4	8.32	1.190
1946	1	12.22	1.220
	2	27.68	1.250
	3	- .99	1.340
	4	141.14	1.320
1947	1	- 47.09	1.475
	2	56.16	1.529
	3	- 20.51	1.571
	4	24.13	1.561
1948	1	41.55	1.581
	2	35.37	1.683
	3	10.03	1.697
	4	- 75.36	1.687
1949	1	173.83	1.674
	2	54.19	1.680
	3	48.38	1.698
	4	52.68	1.687
1950	1	293.00	1.680
	2	421.03	1.745
	3	870.58	1.825
	4	-136.94	1.838
1951	1	61.07	1.840
	2	9.92	1.903
	3	34.56	1.997
	4	24.40	1.993

TABLE I (CONT'D.)

Year	Quarter	Marginal Revenue Product	Average Hourly Wage Rate
1952	1	$ 17.32	$1.992
	2	50.95	2.021
	3	15.62	2.068
	4	- 57.96	2.064

Source: Average hourly wage rate data is from the International Woodworkers of America. Marginal renenue product data has been derived from figures provided by the West Coast Lumbermen's Association.

company to which they are loaned to pay part or all of the base wage of each individual. This has the result of lowering physical productivity by an amount determined by the length of time spent on the fire, and the number of sawmill workers engaged in fire fighting. At the same time the number of man-hours worked may actually increase, because normal eight-hour days are not always feasible when forest fires are out of control. The result can be a very large fall in production and a negative marginal physical product. A more important reason may be the very rapid demand (and price) fluctuations which characterized the period. Many of the sudden demand increases were met in the first instance by a (sometimes violent) price rise, and production and employment lagged for two to four quarters. The result, of course, was a large and immediate increase in MVP.

(2) In only one of the sixty-four observations does the computed MVP come within hailing distance of the actual wage rate. For the most part the derived figures are far above or well below the actual figures, with the former predominating. Part of the reason for this situation can be found in the dynamic nature of the lumber industry. No reliable figures concerning the capital-labor ratio are available, but it is known that at least during the first

ten years of the period there was a large scale introduction of several cost reducing innovations.[1] One of the results of this process of rationalization was a somewhat erratic, but pronounced increase in average productivity.[2] With average productivity increasing, marginal productivity of necessity will also rise. If, in spite of a few startling reversals of form, marginal productivity was generally rising throughout the period, there is nothing strange in the conclusion that wage rates should lag behind like the tail of a kite.

(3) According to the marginal productivity theory, anytime the MVP falls below the wage rate, unemployment will follow after some interval. This unemployment will not be relieved until the wage rate has declined (or, alternatively, until the MRP has risen) to the point where the two quantities are equal. From a glance at Table I, it can be ascertained that there are fourteen instances in which the marginal revenue product was less than the current average hourly wage rate in the period 1937-1952. If Appendix "F" (the data on sawmill employment) is consulted it will be

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[1]See for instance: Dexter M. Keezer, The Douglas Fir Lumber Industry (Washington, D. C.: Advisory Committee to the Council of National Defense, 1942).

[2]See Appendix "G"

seen that in exactly half of these cases employment actually rose from the preceding quarter.

Perhaps a fairer measure of employment in this sort of comparison is the number of man-hours worked. Table II contains the total number of man-hours employed during each quarter. It was obtained by multiplying monthly employment by the average number of hours worked per month per employee, and summing the result for each three-month period. When the fourteen cases in which the marginal revenue product fell below the prevailing wage rate are ranged against the data in Table II it will be noted that in four of the quarters employers increased the number of man-hours they employed. In either case it will be noted that unemployment did not always follow from "excessive" wages.

The third method of analysis involved computations which led to the following coefficients of correlation:

1. Marginal Revenue Productivity and average wage rates; no lag ..... .418
2. Marginal Revenue Product and average wage rates; six-month lag ..... .488
3. Marginal Revenue Product and average wage rates; one-year lag ..... .487

The corresponding coefficients of determination are as follows:

1. Marginal Revenue Product-average wage rates; no lag ..... .174

TABLE II

TOTAL MAN-HOURS WORKED PER QUARTER

1937-1952

Year	Quarter	Total Man-Hours (000)	Year	Quarter	Total Man-Hours (000)
1937	1	7099	1944	1	9344
	2	8558		2	9549
	3	8107		3	9001
	4	5667		4	8283
1938	1	5552	1945	1	8274
	2	5770		2	7881
	3	6511		3	6397
	4	6224		4	4319
1939	1	6194	1946	1	6177
	2	6968		2	6781
	3	7389		3	6398
	4	7418		4	6847
1940	1	7858	1947	1	7629
	2	7726		2	8207
	3	8177		3	8107
	4	8094		4	8314
1941	1	8181	1948	1	8695
	2	7981		2	7896
	3	8806		3	9605
	4	8036		4	9274
1942	1	8473	1949	1	8873
	2	9094		2	9993
	3	8640		3	9259
	4	7929		4	9463
1943	1	6852	1950	1	9397
	2	7905		2	9577
	3	7786		3	9635
	4	7638		4	9876

TABLE II (CONT'D.)

Year	Quarter	Total Man-Hours (000)	Year	Quarter	Total Man-Hours (000)
1951	1	9817	1952	1	10233
	2	11067		2	10454
	3	9997		3	10980
	4	10099		4	11379

Source: Industrial Facts Department, The West Coast Lumbermen's Association, Employment Statistics.

2. Marginal Revenue Product-average wage rates; six-month lag ..... .238

3. Marginal Revenue Product-average wage rates; one-year lag ..... .237

The low correlations could be expected from the evidence of Graph II, which shows a considerable lack of correspondence in the turning points of the two series. That disparity in co-variation is somewhat improved as wages are deliberately lagged. This would indicate a six- to nine-month lag between changes in marginal productivity and changes in wage rates for that very small degree of determination suggested by the correlations.

The necessary crudity of this attempt to relate the marginal productivity theory to a real industrial situation has been noted. Perhaps the only thing reflected in these results is the futility of the attempt. At a minimum, though, it focuses attention on two facts: (1) that the conditions imposed by the theoretical assumptions of marginal productivity typically are not met in a dynamic industrial world; and (2) as a result, the theory does not describe accurately the process of wage determination, expecially in the short run. The graphic, tabular, and statistical evidence presented above all agrees in one thing: there is a decided lack of correspondence between wages and employment on the one hand and the MVP on the

other. The disparity is so large as to suggest that, even were data available to warp the facts to better meet the assumptions of the theory, even then no very close covariation would be discovered.

Conclusions

(1) Both the theoretical discussion earlier in the chapter and the statistical examination above indicate that the marginal productivity theory does not adequately describe the process of wage setting in the short run. Even in the long run the myriad subjective elements which must be included in the marginal value product mean that, at best, the theory will yield indeterminate results. Its answers must be expressed in terms of several possible levels of employment and bands of possible wage rates.

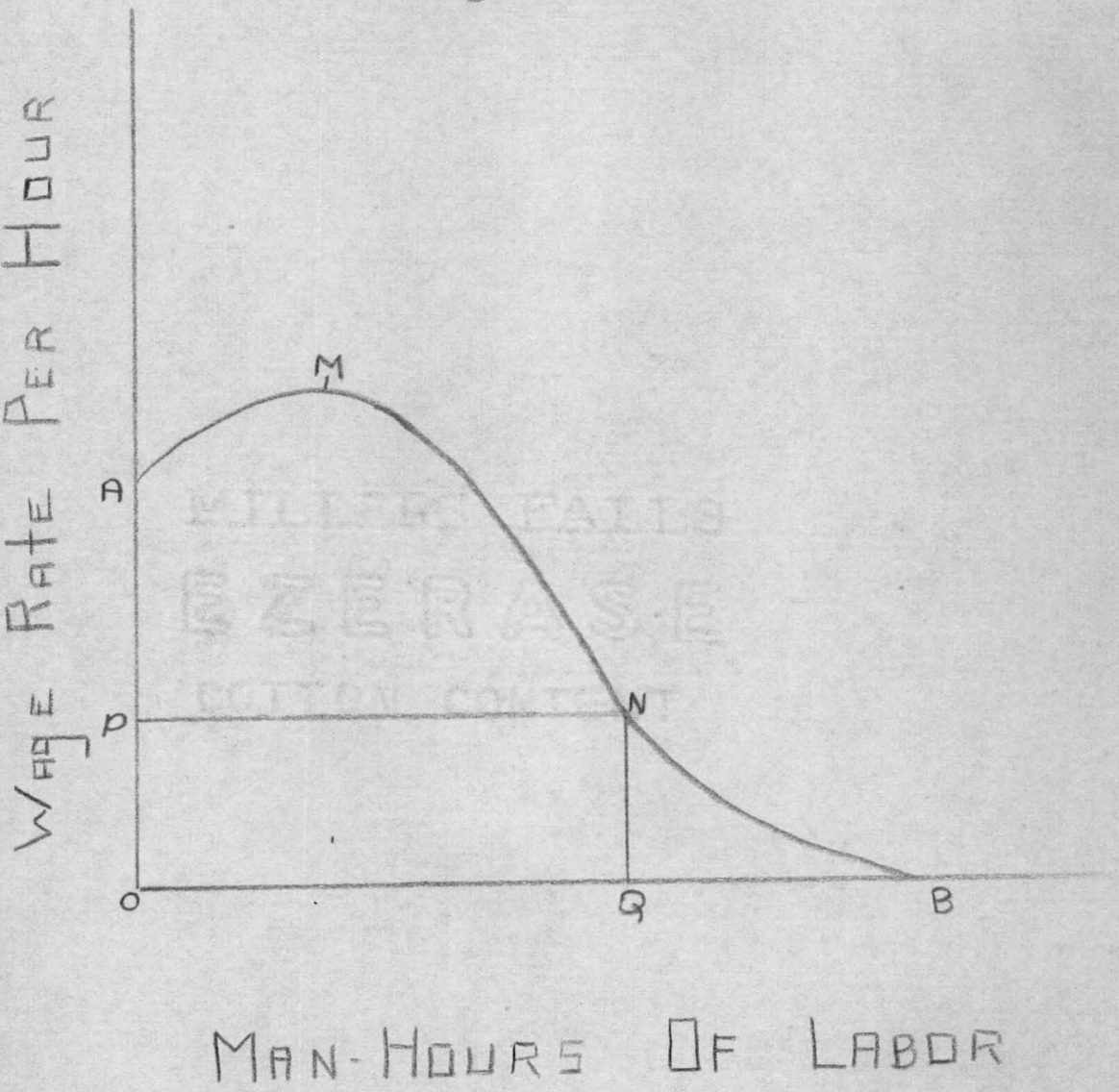
(2) Some of the assumptions upon which the theory is based are very far removed from reality. It is the opinion of the writer that any attempt to explain the wage setting process solely in terms provided by the theory will yield results which are grotesque. If these assumptions are modified or altered it must be recognized that, while it better serves reality, the theory also sacrifices several of its most prized features. E.g., if the assumption of perfect competition is abandoned the process which the theory describes is no longer an absolutely necessary

one; under imperfect competition it is possible to speak of price and wage policies. If it is admitted that a very large number of subjective elements enter into the estimation of MVP, then the theory can no longer be said to be even approximately determinative; at least it cannot be meaningfully verified. If the possibility of long term unemployment is admitted, then the probability arises that over a long range of possible production levels wage rates and employment will bear no very close relation to MVP. Etc., etc.

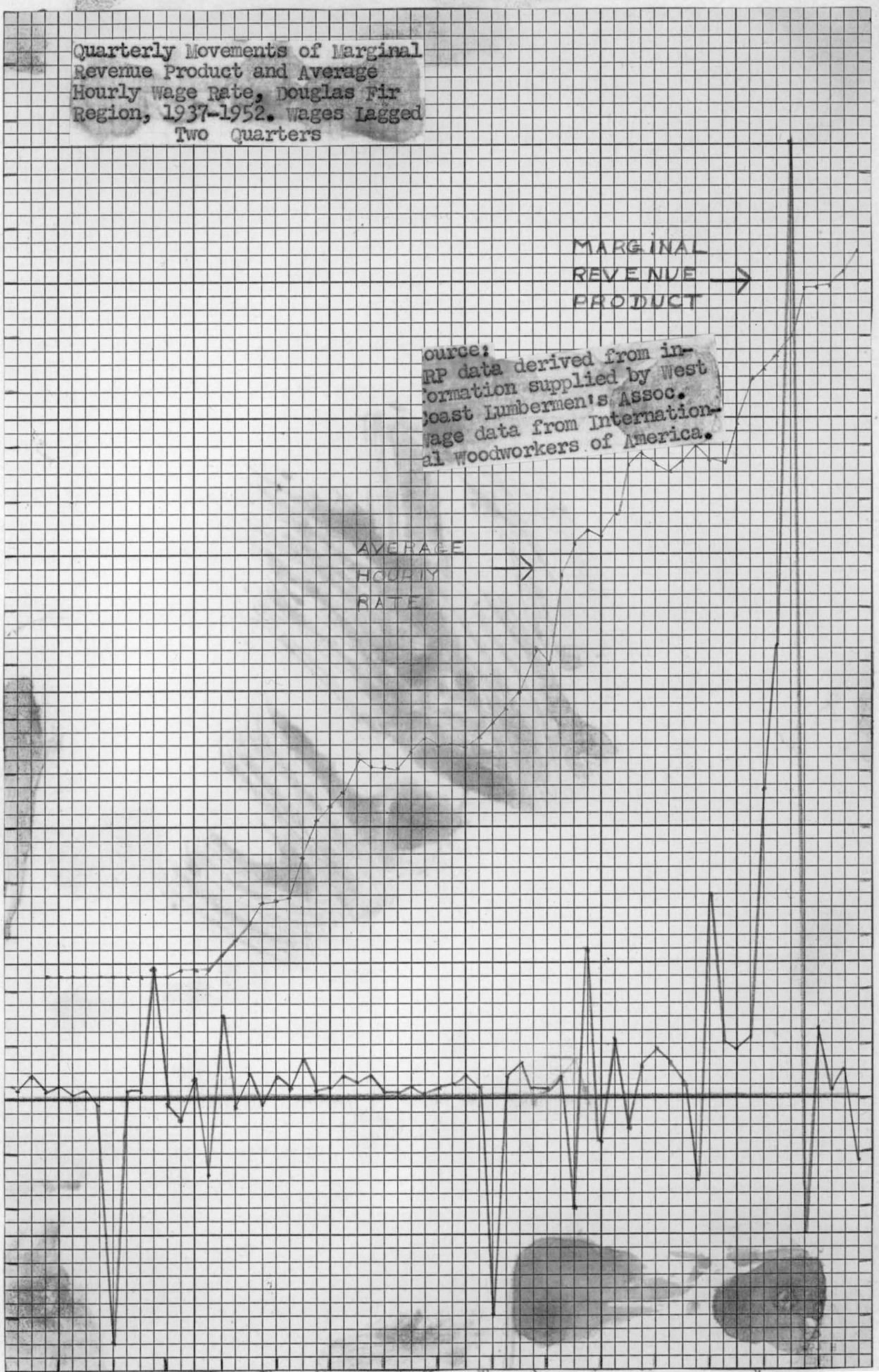
(3) In spite of this criticism the marginal productivity theory has its uses. It very properly emphasizes that the profit motive, while it cannot be accepted uncritically, is the one most powerful factor in the making of business decisions. The theory correctly describes what is probably the businessmans' most frequent approach to his employment question: "How much are these men worth to me?" In this one basic question the theory has erected a framework within which and from which all further speculation must proceed.

Graph I

The Determination of wage rates by use of the Marginal Productivity Analysis.



Graph II


Quarterly Movements of Marginal Revenue Product and Average Hourly Wage Rate, Douglas Fir Region, 1937-1952. Wages Lagged Two Quarters
MARGINAL REVENUE PRODUCT
AVERAGE HOURLY RATE
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RP data derived from in-
formation supplied by West
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age data from Internation-
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CHAPTER IV

MONEY WAGES AND MOVEMENTS OF WHOLESALE PRICES

Since the marginal productivity theory has been rejected as an explanation of short run wage rates, it is incumbent upon the author to offer some alternative. Consequently, this chapter and those succeeding it will be devoted to the examination of a number of possible determinants of wages. These several explanations are to be considered complementary, reinforcing each other. Each will be scrutinized to determine its effect upon the bargaining strength of the two parties at the conference table. Thus, what follows is essentially a bargaining theory of wages.

The present chapter will be a study of the extent to which the two money wage measures react to changes in wholesale prices. The wholesale price series used here refers to a weighted average of eight types of Douglas Fir lumber. It was derived by the author from data contained in the "Wholesale Prices--Industrial Commodities" series, published monthly by the Bureau of Labor Statistics. The sequence computed by the author is expressed in current dollars, and was obtained in the following manner. The

Bureau of Labor Statistics data contains, inter alia, weights indicating the relative importance to total Douglas Fir production of each of the eight types of lumber included in the series, and current primary market prices.[1] For each month these weights were multiplied by the appropriate price and the products summed. Each of these summations was then divided by the sum of the weights, and the resulting quotients were accepted as a weighted average of current wholesale prices. Three-month averages of this latter figure were taken in order to obtain a quarterly series.

These wholesale price data contain two serious defects which should be noted before an attempt is made to evaluate the price-wage comparison to be made later in this chapter. The first is that the figures for 1937 through 1939 are not strictly comparable to those of the succeeding years. Prior to 1940 the B. L. S. used only two, rather than eight, types of Douglas Fir in its individual commodities index, and as a consequence prices for the first three years of the time period will tend to be less accurate than for subsequent years. The second defect lies in the fact that for the period 1937 through

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[1]The B. L. S. term "primary market," as applied to the lumber industry, means the first sale at or from the millsite.

1950 the base year employed by the B. L. S. in determining weights, etc. was 1926. From 1951, however, it used the average of 1947-1949, and in establishing this new base it altered somewhat its method of determining weights. As a result, the final two years in this series will not be perfectly consistent with the preceding years.

Method of Analysis

In comparing the wholesale price data with the two measures of wages, the author first employed a graphic technique which was designed to provide visual representation of the raw statistical material. In each case, three situations were taken into consideration: each wage series was compared with prices on the basis of no wage lag, a six-month wage lag, and a one-year wage lag. It was reasoned that if wages are rigid enough that they do not respond immediately to changes in whatever variables may determine them, more accurate comparisons might be obtained by using lagged data. In this particular case, the extent of co-variation is so nearly identical in all six comparisons that it was felt no useful service would be served by presenting all the graphic material. Consequently, two graphs only are included: wholesale prices with a six-month hourly wage rate lag; and wholesale prices with a six-month lag in average wage payment per employee.

The graphic form is a convenient approximation, but it is not a substitute for the greater precision of statistical analysis. Therefore, the writer has also calculated a coefficient of correlation for each of the six pairs of relations discussed above.[1]

Results

Visual inspection of the graphs will show what appears to be a remarkably close co-variation in each of the cases. This impression is amply borne out by the correlations obtained. These were:

1. Price-hourly wage rate; no lag ..... .968
2. Price-hourly wage rate; three-month lag . .976
3. Price-hourly wage rate; six-month lag ... .985
4. Price-average wage payment; no lag ..... .956
5. Price-average wage payment; three-month lag ..... .947
6. Price-average wage payment; six-month lag .938

If one assumes a causal relation between lumber prices and sawmill wages, these correlations mean that any given fluctuation in wages is almost entirely explained by

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[1]The process used was a standard method of linear correlation. It is presented in: William A. Neiswanger, Elementary Statistical Methods (New York: The Macmillan Co., 1943), pp. 657-59.

changes in prices. Specifically, the percentage of wage variation attributable to prices in each of these six cases would be:[1]

Case 1 ...	.937	Case 4 ...	.914
Case 2 ...	.953	Case 5 ...	.897
Case 3 ...	.970	Case 6 ...	.880

Before any attempt at interpretation is essayed, two very basic precautions must be set forth. First, correlation coefficients are purely relative, never absolute figures. Consequently, regardless of its magnitude, it is impossible to say of any specific correlation that it is high or low without relating it to a normal curve for the whole universe of correlations of the data with which you are dealing. Second, for statistical reasons any two series which exhibit a consistent and generally uninterrupted rise or fall over the time period under examination will inevitably yield high positive correlations. Thus, in the figures shown above, it cannot be said that they are "high" because for the period 1937-1952 all possible correlations of the several series might fall within a range of .85 to .95.

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[1]This is the coefficient of determination. It is simply the square of the coefficient of correlation, and is a measure of the percentage of variance in the dependent variable which is explainable from the independent variable. See: Ibid., pp. 661-62.

Likewise, the existence of any correlation at all might be attributable to the general upward trend in all three series.

Conclusions

In interpreting these results there are, at the outset, two possible assumptions from which to proceed. It may be assumed that a causal connection exists between wholesale prices for Douglas Fir on the one hand, and the wage measures on the other. Alternatively, it may be assumed that, despite the obvious and striking degree of co-variation, no causation is involved. Rather it is more probable that these series are affected similarly by one or more other economic variables. The writer proposes to examine these two possibilities in order.

The Assumption of Causation

If the assumption of causality is true, its theoretical base must lie in the collective bargaining relationships between union and management. It must mean that one of the prime determinants of wage rates is the relative bargaining power of the two parties, and that any rate which is set is a resultant of the interplay of this power. It must mean that, during a cyclical upswing, one of the strongest weapons in the hands of the unions

is a record of high and rising prices for the product of the industry. Although high prices certainly are not an adequate measure of high profit rates, they assuredly suggest profitibility to the mind of the union member. To the extent that high prices represent high profit rates, the employer will be more amenable to wage concessions than he would be otherwise. Since one of the major elements in union wage demands is the recent history of price movements, the high correlations obtained could indicate a close cause and effect relationship between these two variables. Alternatively, during a cyclical downswing falling prices will assuredly affect employer attitudes toward wage changes. To the extent that management can make discretionary revisions (primarily in the average payments field) it is probable that it will act to reduce its wage costs. To the extent that wages (especially average hourly rates) are susceptible to change only through labor-management negotiations, the employer will be prompted to ask for wage decreases or at least vigorously oppose proposals for increases. In either case, a causal connection between lumber prices and wages is clearly indicated.

There is at least one fragment of confirmative evidence available in this argument. In a private

conversation with a policy making official of the I. W. A. the writer point blank asked the question of what determined union wage demands in the lumber industry of this region. In essence, the answer was that, in lieu of accurate information on industry and firm profits, his union necessarily must base its wage demands upon other indications of profitability. One of the most important of these other indications which he mentioned was the record of changes in lumber prices since the last contract.

Nevertheless, there are some important holes in this line of reasoning. One of them is that the argument has greater force in periods of rising prices. It is unreasonable to expect smooth reversibility in union wage policy. While in periods of rapidly falling wholesale prices the union wage demand would certainly be tempered, it is unlikely that downward revisions could be effected as smoothly as increases in times of rising prices. It would be interesting and significant to extend these series into a cyclical downswing and correlate the results. It is the opinion of the author that in such a case wages would exhibit a far greater rigidity in the downward direction than prices because of the strength and militancy of the two unions in this area. As a consequence the correlations of these variables would not be nearly so large as those for the period 1937-1952.

A second defect of this interpretation is that four of the years in question fell within that period of World War II when the federal government established rigid and reasonably effective price and wage controls. Any attempt to interpret the figures for these years as if they were the result of free market movements would be futile. Given the success of the government in maintaining stable price levels, it is hardly remarkable that the fluctuations for these years are very similar.

The Assumption of No Causality

The second alternative, involving the assumption of no causal relation, must address itself to an explanation that will account for the high computed correlations on some basis other than the simple relationship of prices and wages. The foundation of this other interpretation must be the existence of one or more variables not previously taken into account, but which have affected both the price and wage data in a similar manner. Those who deny causality maintain that the period being studied has considerable significance in and of itself. The years 1937 to 1952 were characterized by an almost unbroken rise in that complex of conditions which is collectively called economic prosperity. Specifically, prosperity has meant that, with two exceptions, money wage payments have

increased each year since 1937;[1] that disposable income has fallen significantly from the previous year only in 1938;[2] that corporate profits have fallen significantly from the previous year only in 1939 and 1945, and the latter would hardly be classed as a recession year;[3] that business net income has fallen only in 1938 and 1945;[4] that full employment was reached by 1942 after a steady and scarcely broken rise from 1937, and has remained at extremely high levels ever since;[5] and that both consumer and wholesale prices have risen consistently from 1940 to 1952 with one short period of relative stability in 1949.[6] All this has been translated to the lumber industry in the form of high and rising demand;[7] shipments totals that

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[1]U.S., Department of Commerce, National Income, A Supplement to the Survey of Current Business (Washington, D. C.: Government Printing Office, 1951), p. 160.

[2]Ibid., p. 151.

[3]Ibid., p. 157.

[4]Ibid., p. 156.

[5]The Monthly Labor Review of the Bureau of Labor Statistics contains employment information in each issue.

[6]Ibid. Both Consumer and Wholesale Price indices are contained therein.

[7]See Appendix "E."

were usually insufficient to keep pace with demand, so that for most years in question there was a large backlog of unfilled orders; money income that fell significantly only in 1938, 1945, and 1949;[1] and a long term shortage of skilled labor dating from 1941.[2]

During this period, there were only two recessions, both of which were of short duration. That of 1938 was sharp and widely felt, while that of 1949 was weak and scarcely noticed by most Americans.

Thus, from 1937 to 1952 there was an almost continuous upward pressure on both prices and wages, and, to a large extent, these pressures were directly interrelated. If ever the nation has witnessed a price-wage spiral this was the time. The three occasions upon which business activity fell off (1938, the post-war readjustment period late in 1945, and 1949) the length of the recession was so short that regression lines for lumber price-wage relationships were scarcely affected.

Throughout these periods of recession average hourly wage rates remained nearly constant, fluctuating

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[1] U.S., Department of Commerce, National Income, pp. 158-59.

[2] U.S., Bureau of Labor Statistics, Wages in the Lumber Industry of the Far West, 1944, Bulletin No. 840 (Washington, D. C.: Government Printing Office, 1945).

downward $.008 in 1937-1938, actually rising in 1945-1946, and falling $.017 in 1948-1949. Coincidentally, average wage payments fell 12 to 15 per cent in each of the cases, thus reflecting their greater flexibility. At the same time, fir prices declined 20 to 21 per cent in 1938 and 1949, while they remained nearly constant in 1945-1946.[1]

A conclusion to the argument of no causality falls into two parts: (1) The theoretical inference that in periods of prolonged recession wages would tend not to fall so far or so fast as prices, and that as a consequence price-wage data during such times would not yield correlations nearly so large as those obtained in the instant case, appears to have some factual confirmation in the price-wage reactions of 1937-1938 and 1948-1949. (2) The magnitude of the computed correlations in this case are explainable by the special circumstances which characterized the period under examination. Had the period contained a full major business cycle, the spuriousness of these correlations would be obvious. Since, however, it was one of highly favorable economic conditions which gave rise to an almost continuous price-wage spiral on the national scene, the true explanation of the large correlations lies in local reactions to these conditions such

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[1]Compare Appendices "B," "C," and "D" on these points.

that sawmill wages and lumber prices rose in very closely parallel manner. The instances of recession, which might otherwise have been expected to reduce the size of the correlations, were of such short duration in relation to the total time period under study, that their effectiveness in accomplishing this result was insignificant.[1]

Other Comments

The assumption of a closer co-variance as wages are deliberately lagged behind prices is only tenuously borne out by increasing correlations for each of the price-average hourly rate series. Once this point is grasped, however, care must be taken not to make too much of it. The fact that the average payments series shows declining correlations should give pause, although this can be explained away on the grounds that the greater flexibility of this measure of wages may allow for considerable offsetting of short term wage movements. The most important factor limiting conclusions which may be drawn on this point is that the differences in coefficient values are not large enough to be of any real significance.

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[1]With respect to lumber prices, the number of quarters in which prices were falling amounted to seven out of a total of sixty-four, or 11 per cent of the cases. See Appendix "D" on this point.

The total difference between the no lag and six-month lag comparisons of prices and average hourly rates is only .017. Therefore, any conclusions drawn on this basis are very inconclusive. The total difference between the lowest correlation (.938 for the six-month lag in average payments) and the highest (.985 for the six-month lag in average hourly rates) is only .047. Considering the flaws which have been demonstrated in the price series, any conclusions based on differences this small would be meaningless.

Synthesis

Two opposing explications of the remarkable degree of co-variation between wholesale prices and wages have been put forward. The author believes that the first argument contains a definite germ of truth, in that, by admission of one who participates in union policy making, the level of prices is one of the main determinants in the formulation of union wage demands. On the other hand, it seems reasonable to assume that the effects on employer wage policies of price declines will lend some reversibility to the influence of wholesale prices on wages.

Other things being equal, when prices are rising the average hourly wage rate should react after some undetermined lag because (1) union negotiators are able

to point with some justice to this as evidence of increasing profitability; and (2) management resistance to these demands should be considerably weakened insofar as the union assumption is correct. The effect upon average wage payments is less clear because of the greater opportunity for management voluntarily to change this magnitude. If, however, rising prices are indicative of increasing demand or amounts demanded, it is probable that average payments will also increase as unemployment is reduced and overtime hours are offered. The lag between changes in prices and variations in average payments should be less than the lag between prices and hourly rate changes because of the discretionary elements in the former.

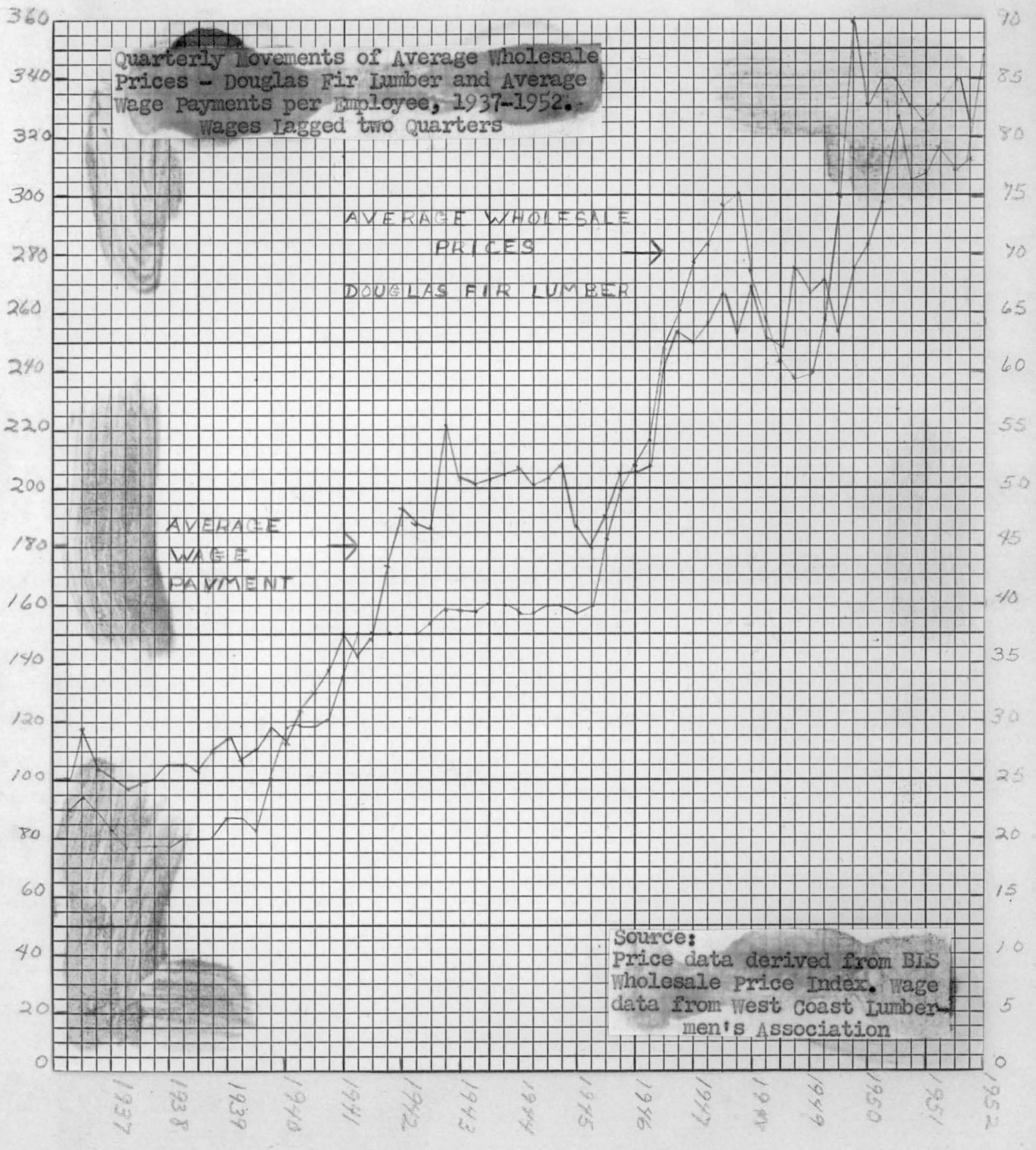
Ceteris paribus, when prices are falling the hourly rate should exhibit considerable rigidity because (1) it is negotiated annually as a general rule; and (2) the unions with which it must be negotiated are militant and strongly entrenched; they are likely vigorously to resist any wage cuts. Nevertheless, this resistance could not be entirely successful in the event of a severe recession. As a consequence, some downward flexibility in the face of continuously falling prices is to be expected. As for average payments, a recession is likely to elicit employer reactions specifically designed to reduce wage

costs. Reductions in labor force, overtime offered, straight time hours worked, etc. all will tend to diminish the size of average payments, as will, of course, any lowering of hourly rates.

To argue that the above considerations justify the conclusion that fluctuations in wage rates are 90 per cent determined by changes in prices is inadmissible. There is a great deal of validity in the contention that the generally rising trend in the three series adequately explains the correlations obtained.

It is the opinion of the writer that, in the lumber industry of this area, wage changes are attributable in part to variations in wholesale lumber prices. The extent of this functional relationship is obscured because the data used in this paper cannot be extended over an entire major cycle, but, again in the opinion of the author, the existence of that relationship is undeniable.

Graph III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Quarterly Movements of Average Wholesale Prices - Douglas Fir Lumber and Average Wage Payments per Employee, 1937-1952. Wages Lagged two Quarters
AVERAGE WHOLESALE PRICES
DOUGLAS FIR LUMBER
AVERAGE WAGE PAYMENT
Source:
Price data derived from BLS Wholesale Price Index. Wage data from West Coast Lumbermen's Association
1937
1938
1939
1940
1941
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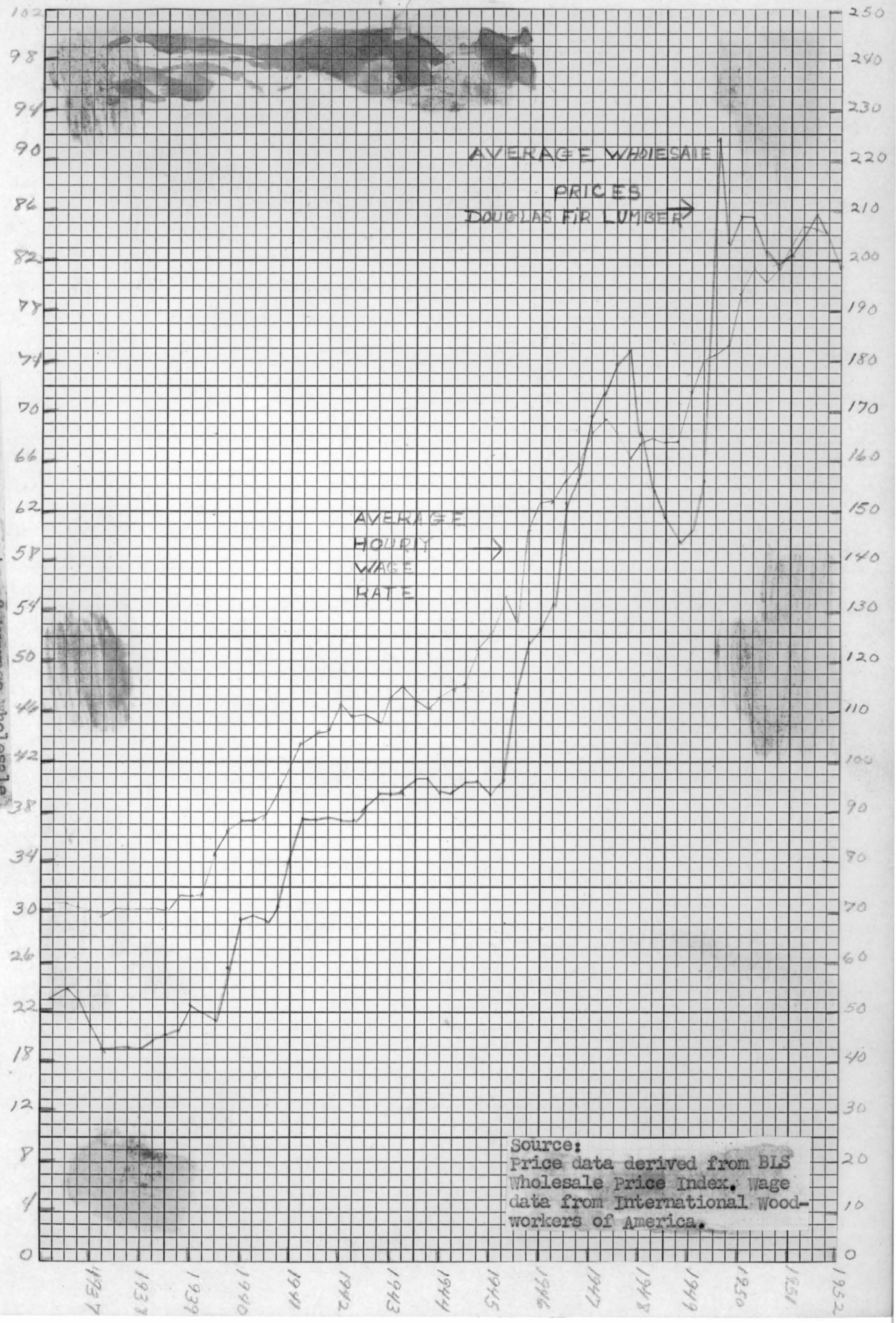
Graph IV



Quarterly Movements of Average Wholesale Prices -- Douglas Fir Lumber and Average Hourly Wage Rate, 1937-1952. Wages Lagged Two Quarters

CHAPTER V

MONEY WAGES AND THE AMOUNT DEMANDED

In this chapter the author proposes to examine the relationships, if any, between the amount of Douglas Fir lumber demanded from the sawmills of western Oregon and Washington and the wages and wage rates paid in these sawmills. Four statistical series have been used in making these comparisons--two measures of wages and two of the amount demanded.

Wage Measures

The two wage series used here are identical with those which were described in Chapter II above. One is the average hourly wage rate computed in quarterly terms, and the other is the average pay check per employee per quarter.

Amount Demanded

The first gauge of the amount demanded which is used here is new orders received at millsites during each period. This figure was obtained from data compiled by the

West Coast Lumbermen's Association,[1] and is used here in almost its original form. The only change that has been made is to obtain the sum of the figures for each successive three-month period so that the data are expressed quarterly.

The unfilled orders series consists of new orders placed during the current period, plus the backlog of orders placed in any previous period but not shipped by the beginning of the current period. This sequence was derived in the following manner. The basic figure was that for new orders; for any given time span it is impossible for unfilled orders to fall below the new orders received during that span. If, however, during the previous quarter, total shipments from the millsite[2] did not equal or exceed the total of unfilled orders for that quarter, the difference was added to new orders for the current period to obtain the current unfilled orders figure.

For several reasons, the writer felt it desirable to use both of these sequences. The new orders series is

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[1]From 1937 through June, 1939, those data were published in the: Industrial Facts Department, Barometer (Seattle, Washington: West Coast Lumbermen's Association). From July, 1939, to date the source is: Industrial Facts Department, Monthly Lumber Facts (Portland, Oregon: West Coast Lumbermen's Association). The two series are identical and continuous.

[2]The data on shipments may be found in: Ibid.

included because it is certainly a more sensitive indicator of current market conditions than is the other. A change either in demand or the amount demanded will be reflected faithfully in the new orders figures, while this is not necessarily true of the unfilled orders series. For example, a prolonged cyclical fall in demand or the amount demanded will eventually bring about the exhaustion of unfilled orders, but if this backlog is large to begin with, it is entirely possible that neither wages, production, nor employment will exhibit declines commensurate with the fall in new orders until several months after the turning point. Unfilled orders are included because, under certain circumstances, they are the more relevant data for determining levels of wages. For example, during the last three quarters of 1945 new orders fell precipitately to less than one-fourth the level at which they stood in the first quarter of that year. At the same time average hourly wage rates rose, lumber prices remained approximately stable, average wage payments, production, and employment declined, but by much less than new orders.[1] It is quite probable that at least a part of the explanation for the failure of the variables to react to the fall in new orders is that the backlog of unfilled orders enabled

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[1]Compare Appendices "B," "C," "D," and "F" on this point.

producers to maintain production, employment, etc., until the demand for lumber revived with the civilian building boom which began early in 1946. It would be difficult, if not impossible, to account for this situation if the new orders series was used exclusively. Finally, it was felt that by contrasting the results obtained by using both these series, more meaningful conclusions could be reached than if just one of them were employed.

It should be pointed out that neither new orders nor unfilled orders represents demand in the schedule sense, but rather the amount demanded in the current period. It is not even sure that they represent the amount of effective demand: especially is this so during the two intervals of war scarcity, i.e., 1942 through 1944 and the last two quarters of 1950 through 1951. In times such as these it is not unusual for purchasers to place orders for which they have no immediate use, and which they would be hard put to assimilate were they delivered promptly, in the hope of receiving some part of that order at a future time. Of course, it is impossible to measure this quantity, and the reported data must be accepted at face value.

Method

The method of analysis is substantially the same in this chapter as in the preceding one. In each of the

four comparisons--new orders and average hourly wage rates, new orders and average wage payments, unfilled orders and average hourly wage rates, and unfilled orders and average wage payments--three situations are examined. The first is a quarter-by-quarter analysis with no lag present; the second lags wages six months behind the amount demanded; and the third lags wages one year behind the amount demanded. It is felt that the respective periods will allow for (1) any adjustments which are discretionary with the employer and which may thus be instituted over a relatively short period of time; and (2) longer run changes that are dependent on contractual arrangements and which may require as much as a year to work out.

As before the graphic method will be used to provide a means of visual comparison. Where the magnitude of the correlations is so nearly identical that the differences are insignificant, only the case of the six-month lag will be graphed.

Again as before, the technique of linear correlation is used to draw a more accurate statistical comparison between the variables.

Results

The following coefficients of correlation were obtained:

1. New orders-average hourly wage rate; no lag ..... .633
2. New orders-average rate; six-month lag . .790
3. New orders-average hourly wage rate; one-year lag ..... .635
4. New orders-average wage payments; no lag .659
5. New orders-average wage payments; six-month lag ..... .681
6. New orders-average wage payments; one-year lag ..... .695
7. Unfilled orders-average hourly wage rate; no lag ..... .861
8. Unfilled orders-average hourly wage rate; six-month lag ..... .878
9. Unfilled orders-average hourly wage rate; one-year lag ..... .902
10. Unfilled orders-average wage payments; no lag ..... .913
11. Unfilled orders-average wage payments; six-month lag ..... .915
12. Unfilled orders-average wage payments; one-year lag ..... .916

The coefficient of determination, i.e., the percentage of the total variance of the wage measures which is explained by fluctuations in the amount demanded series, is as follows for each of the cases:

1. New orders-average hourly wage rates; no lag ..... .401

2. New orders-average hourly wage rates; six-month lag ..... .624

3. New orders-average hourly wage rates; one-year lag ..... .403

4. New orders-average wage payments; no lag ..... .434

5. New orders-average wage payments; six-month lag ..... .463

6. New orders-average wage payments; one-year lag ..... .482

7. Unfilled orders-average hourly wage rate; no lag ..... .740

8. Unfilled orders-average hourly wage rate; six-month lag ..... .770

9. Unfilled orders-average hourly wage rate; one-year lag ..... .813

10. Unfilled orders-average wage payments; no lag ..... .833

11. Unfilled orders-average wage payments; six-month lag ..... .837

12. Unfilled orders-average wage payments; one-year lag ..... .838

Conclusions

Several specific things will be noted concerning these results.

(1) Wages (both hourly rates and average payments) appear to be considerably more closely related to unfilled order than to new orders for the period 1937-1952. For

the several comparisons, the unfilled orders correlations run .2 to .27 higher than the new orders correlations, and consequently the coefficients of determination are consistently .3 to .4 higher. Two comments seem appropriate here. First, this supports the contention stated earlier, that the greater sensitivity of the new order series to market conditions should make it a less accurate measure of sticky wage rates and payments than unfilled orders. The fluctuations of the latter, under certain conditions, are likely to be considerably damped relative to new orders. As a result of this comparative rigidity in both the wage series and unfilled orders, a closer degree of co-variation can be safely predicted.

Second, the importance of the distinction between new orders and unfilled orders will be severely impaired once the lumber industry begins to experience a cyclical or secular downswing. Such a downswing, almost by definition, involves a cumulative and long run fall in demand and production, and, therefore, it is unlikely that any backlog of orders would build up. Perhaps it would be more accurate to say that in depression phases of the cycle the unfilled orders category simply disappears, and new orders becomes the only available measure of amount demanded. In interpreting the results of the wage-unfilled

orders analysis, it must be remembered that such a comparison is possible only in certain periods and under special circumstances.

(2) Average wage payments are more closely related to both of the demand sequences than are average hourly rates. The differences are relatively small,[1] but consistent: they are nearly the same in both the new orders and unfilled orders series. This is some further evidence of the greater rigidity of average hourly rates over average payments, which has been suggested above. The major determinant of the rate is an annually negotiated contract which is not normally subject to revision during the contract year. On the other hand, the wage rate is only one of the important factors in setting average payments levels: at his discretion the employer can alter such prime determinants of payments as the amount of overtime worked, the size of the labor force, the number of straight time man-hours worked, etc. It is patently easier to change these variables than it is to modify a contractual wage rate.

(3) In the new orders-average hourly rate comparison, the no lag and one-year lag cases show relatively low and nearly identical correlations; but the six-month

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[1]They amount to approximately 5 to 7 per cent.

wage lag situation yields a significantly larger correlation. No obvious explanation of this observation presents itself. If the same pattern were apparent in the correlations of the other new order-wage series it would invite speculation that wage rates and payments were typically revised within about six months of any major fluctuation in the amount demanded as measured by new orders. Such a pattern is not apparent, however. In rebuttal to this point it may be argued that while the general advance in average hourly rates has been accomplished in more or less discrete jumps,[1] the aforementioned greater flexibility of average payments may have conduced to a smoothing out of the upward advance of the payments series. Therefore, the hourly rate should tend to show higher correlations when lagged to a point when it is typically revised, while average payments, being smoother and not so dependent on discontinuous rate increases, should show less striking changes in the magnitude of the correlations as it is lagged. Whether this possible smoothing tendency in the average payments series would be sufficient to level out the large differences (from .633 to .790 back to .635) in the new orders-hourly rate correlations is debatable.

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[1]See Appendix "B." Rate increases are usually effective sometime during the second quarter of each year.

Concerning more general conclusions, the question of causality, which was explored in the preceding chapter, arises again. In the case of the new orders-average payments comparison a cause and effect relationship requires the rather reasonable assumption that employers base man-hour and overtime policies on demand conditions, such as the amount demanded during a given period. If, for example, new orders were to remain below a customarily expected level for a month or more, and the producer could perceive no immediate prospect of an increase, it does not seem unreasonable to assume that management would move to reduce one or more of the relevant variables--overtime hours, straight time hours, or employment. Given this reaction on the part of management, a positive correlation between new orders and average wage payments is indicated, and it may be said that the amount demanded is one of the determinants of this wage series.

In the new orders-average hourly rate relationship, causality would imply that the recent history of fluctuations in current orders strongly affects the attitude of employers toward contractual wage changes at the time of negotiation of contracts. If both past and prospective demand is strong, the employers' resistance to wage increases, ceteris paribus, will be less pronounced than if demand has been decidedly weak.

The arguments in favor of a causal link between unfilled orders and the wage measures are similar to those above. In addition there is a presumption that employers consider not only new orders, but also the backlog of old orders in shaping wage and hour policies. This seems to be the meaning of the higher correlations obtained with this measure of amount demanded. Therefore it might be expected that a fall in new orders would not impart any great downward impetus to wages if management believes the decline will be short lived, and if the unfilled orders figure greatly exceeds that for new orders.

On the other hand, this line of argument can be challenged on the ground that the period 1937-1952 represents a special case. This point of view was developed in detail in Chapter V, above. Briefly, it may be held that the general upward spiral of economic activity which characterized the period affected the variables in a very similar way. Their fluctuations were almost exclusively in an upward direction, and those instances in which downward fluctuations were observed, were in the nature of brief interruptions to the upward trend. Statistically, any two series which exhibit generally rising tendencies inevitably will show a very close correlation. The conclusion, then, is that should the direction of economic

activity be reversed for any great length of time the magnitude of the correlations would be drastically reduced.

The unfilled orders series are most vulnerable to this line of criticism. As has been pointed out the unfilled orders category is largely the product of an expansionary situation. Indeed, as a separate series it is almost sure to disappear during the downward phase of the business cycle. In spite of this, its usefullness in explaining certain wage phenomena associated with the period under consideration render it superior to the new orders series.

The new orders sequence offers some corroboration for those who would dispute the argument for causality. A number of times during the sixteen-year period, new orders fell a significant amount; twice they fell drastically. However, only one of these declines lasted as long as three quarters. In spite of the extremely short duration of these downward fluctuations, they were sufficient to reduce markedly the size of the correlations as compared with the unfilled orders series. It can be asserted, then, that if declines in the independent variables (new orders and unfilled orders) of sufficient intensity and duration were included in the period under study, the co-variation of wages and amount demanded would be greatly inhibited.

Synthesis

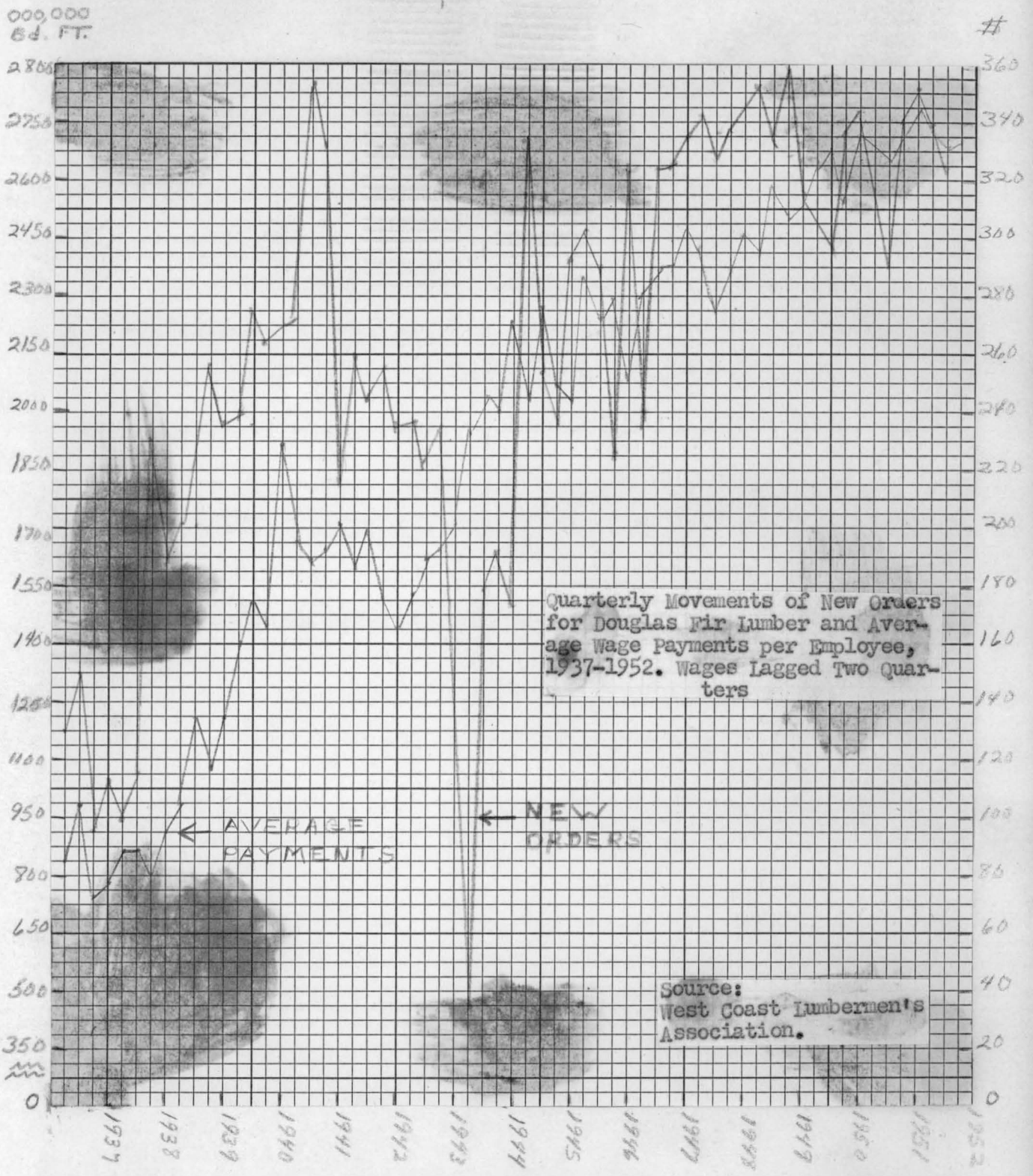
(1) The author has no objection to the proposition that, if this study could be extended over a full major cycle, the relative downward inflexibility of the wage measures when compared with other economic magnitudes would be reflected in lower correlations. It is probable that the reduction in correlations would be manifested more in the average hourly wage rate figure than in the average payments data, because of the greater rigidity of the former. However, without benefit of the specific information, the question of how great would be this reduction is moot.

(2) In the opinion of the writer, it would be a grave error to conclude from this sort of reasoning that no causality exists whatsoever. The effects of new order fluctuations on the wage and hour policies of management ought to be at least as strong during recession phases of the cycle as during expansionary phases. During the falling phase of the cycle the greatest degree of co-variation should be exhibited between new orders and average wage payments, because of the greater means available to the employer for discretionary changes in payments. However, a positive and significant correlation between new orders and hourly rates should also emerge. If the motive of profit maximization is accepted it seems

inevitable that management reactions to fluctuations in amount demanded will have some concrete impact upon average wage payments in particular, and to a lesser extent upon average hourly rates.

(3) If the data for a full cycle were available, the writer would suggest that an adequate measure of the amount demanded would be the new orders figure for the contractionary phase, engrafted onto the unfilled orders data for the upswing. If this series were correlated with the two wage measures, the author would expect the results to show that the amount demanded constitutes one of the several determinants both of wage rates and average payments.

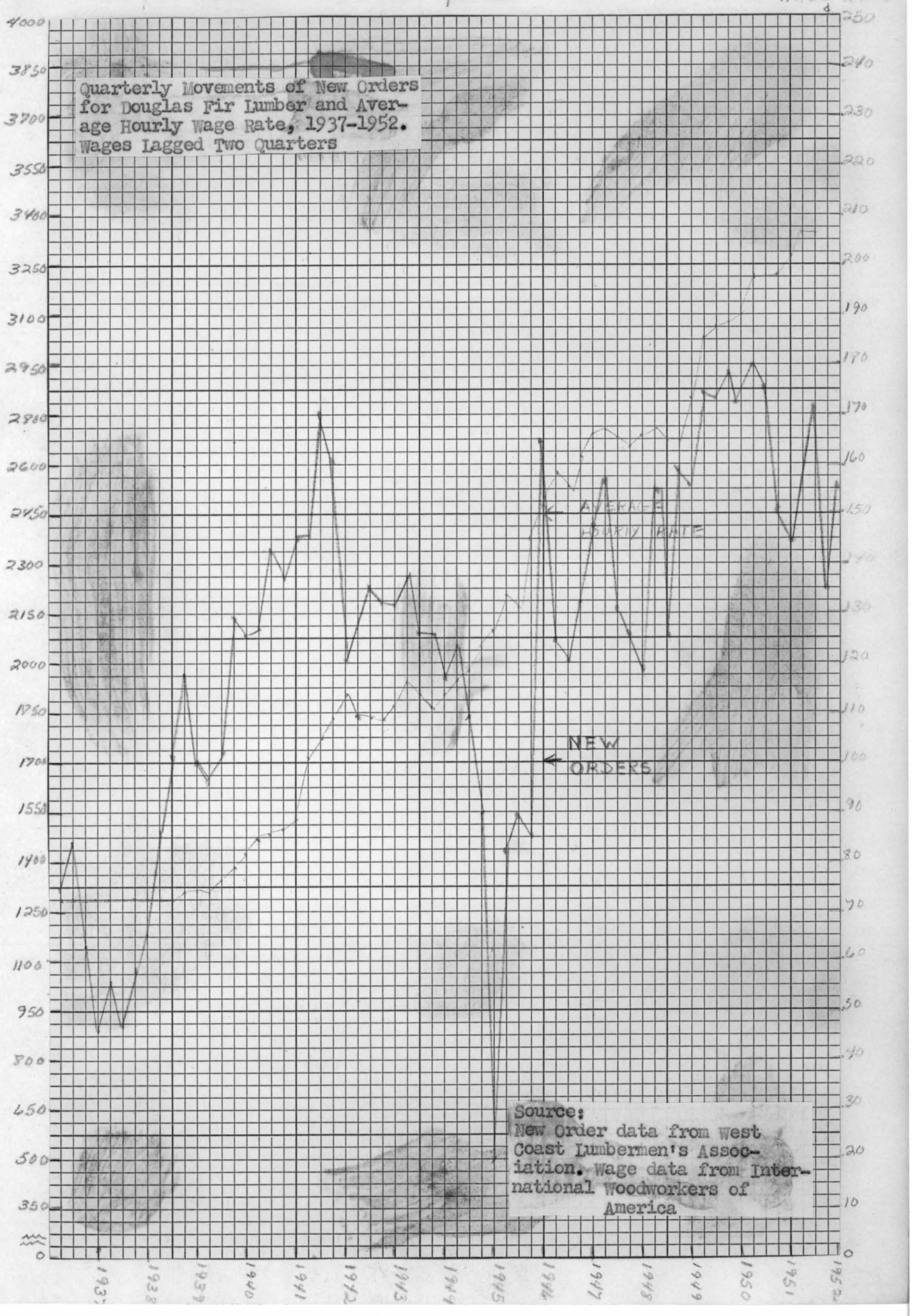
Graph I



Quarterly Movements of New Orders for Douglas Fir Lumber and Average Wage Payments per Employee, 1937-1952. Wages Lagged Two Quarters

Source:
West Coast Lumbermen's Association.

Graph VI



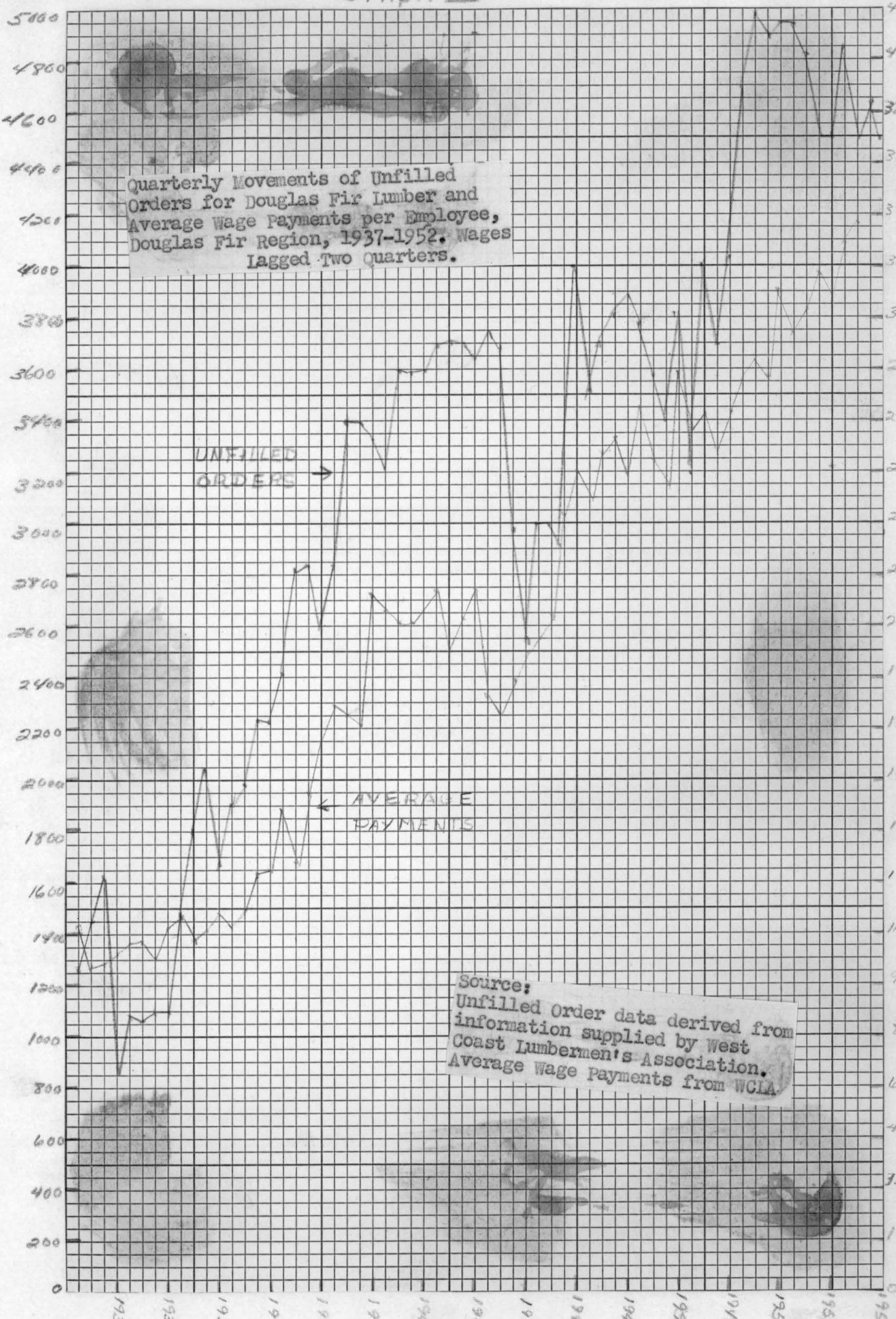
Quarterly Movements of New Orders for Douglas Fir Lumber and Average Hourly Wage Rate, 1937-1952. Wages Lagged Two Quarters

Source:
New Order data from West Coast Lumbermen's Association. Wage data from International Woodworkers of America

Bd. Ft.

Graph VII

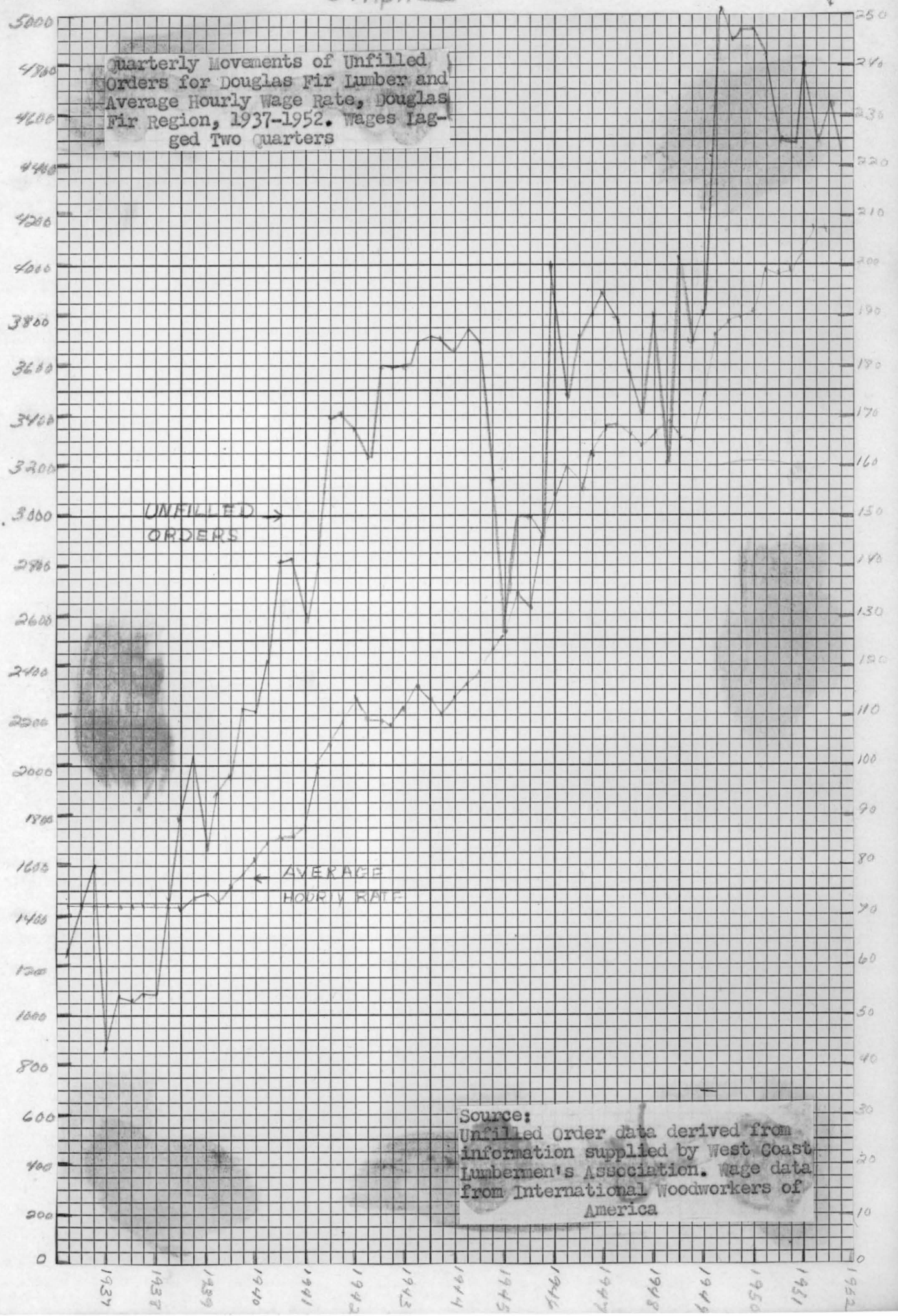
PAYMENTS $



Quarterly Movements of Unfilled Orders for Douglas Fir Lumber and Average Wage Payments per Employee, Douglas Fir Region, 1937-1952. Wages Lagged Two Quarters.

Source:
Unfilled Order data derived from information supplied by West Coast Lumbermen's Association.
Average Wage Payments from WCLA

Graph VIII



Quarterly Movements of Unfilled Orders for Douglas Fir Lumber and Average Hourly Wage Rate, Douglas Fir Region, 1937-1952. Wages Lagged Two Quarters

Source:
Unfilled Order data derived from information supplied by West Coast Lumbermen's Association. Wage data from International Woodworkers of America

CHAPTER VI

MONEY WAGE RELATIVES AND THE CONSUMER PRICE INDEX

The present chapter is designed to fulfill two general purposes. First, and foremost, it is an attempt to determine if any causal relationship exists between the cost of living and the various measures of wages. In this endeavor most of the familiar patterns of the two previous chapters will be followed. Second, although the major concern of this paper is the determinants of money wages, a brief indication of the movements of real wages in sawmills in the period 1937-1952 will be presented. In the attempt to accomplish these two purposes, three statistical series have been employed.

The Wage Measures

In the matter of the wage measures, a departure has been made from the practice of the two preceding chapters. Instead of presenting them in dollar terms, they have been reduced to index form. This change has been made for two reasons: first, as price relatives the two wage series will be more easily comparable to the Consumer Price Index; and second, as price relatives they will facilitate the computation of a real wage series.

The dollar wage measures were converted to relative terms in the following manner. For the period 1935-1939 an average quarterly wage in dollar terms was obtained. This figure was taken as the base, and was then divided into the wage data for each of the sixty-four quarters contained in the period 1937-1952. When the quotients obtained from this division were multiplied by one hundred the result was a series of price relatives for each of the wage sequences. From this it is obvious that the average of real wages during 1935-1939 must have been one hundred, since that period is defined as the base both for the Consumer Price Index and the wage indexes. In order to derive a relative real wage series, the Consumer Price Index was divided into each of the appropriate hourly rate and average payments figures.

Consumer Price Index

The Consumer Price Index[1] was accepted as the most adequate source of information about the cost of living. This index purports to measure the relative cost of items which make up the budget of families of typical wage earners in metropolitan areas. The base period used

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[1]The Consumer Price Index is published in: Monthly Labor Review (U.S., Bureau of Labor Statistics).

in constructing this index is 1935-1939, although since 1951 the Bureau of Labor Statistics has published a new index with 1947-1949 as the base. For several reasons,[1] the Bureau is continuing publication of the "old" index for the time being, and so the latter is used throughout the interval under investigation. The Consumer Price Index used by the author is an average of the indexes for the Portland and Seattle areas. This particular mean was used to make the three series geographically more comparable: i.e., since the income of the sawmill worker is received and largely spent in the Pacific Northwest, cost of living comparisons should be more meaningful when the index used is applicable specifically to the northwest area. Of course, even this does not yield a perfect parallel, for a majority of the sawmills of the Douglas Fir region are not located in Portland or Seattle. No pertinent statement may be made about the differences in costs of living between other areas of the fir region and the two metropolitan centers.

Method of Analysis

No change has been made in the analytical methods applied in the preceding chapters. As in previous chapters

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[1]One of the major reasons for the temporary retention of the "old" Consumer Price Index was that a number of important labor-management contracts contained escalator clauses based upon the "old" index.

the co-variation in the lagged comparisons was not sufficiently unlike to warrant a full graphic treatment, and so the Consumer Price Index has been graphed only once each with the average hourly rate and average payment figures. The two graphs show the wage series lagged by six months in each case. The statistical method is again that of lineal correlation.

The two series depicting the relative real wage movements are presented in tabular form along with the Consumer Price Index series.

Results

The correlations obtained from the several comparisons were as follows:

1. Consumer Price Index-average hourly rate relative; no lag ..... .996
2. Consumer Price Index-average hourly rate relative; six-month lag ..... .993
3. Consumer Price Index-average hourly rate relative; one-year lag ..... .980
4. Consumer Price Index-average payments relative; no lag ..... .975
5. Consumer Price Index-average payments relative; six-month lag ..... .936
6. Consumer Price Index-average payments relative; one-year lag ..... .952

TABLE III

CONSUMER PRICE INDEX AND PRICE RELATIVES FOR AVERAGE REAL HOURLY WAGE RATES AND AVERAGE REAL WAGE PAYMENTS 1937-1952

Year	Quarter	Consumer Price Index	Price Relative For Average Real Hourly Rate	Price Relative For Average Real Wage Payments
1937	1	102.0	95.2	101.1
	2	102.6	104.2	119.5
	3	104.2	102.8	109.9
	4	103.2	104.1	97.2
1938	1	102.4	104.7	102.1
	2	101.4	105.3	102.1
	3	101.4	104.7	111.3
	4	101.4	105.6	111.1
1939	1	100.8	105.6	109.6
	2	100.6	106.0	117.5
	3	102.4	104.4	117.4
	4	100.9	105.9	113.7
1940	1	100.6	107.4	115.8
	2	101.2	106.7	119.4
	3	101.6	106.4	118.4
	4	101.6	110.9	124.0
1941	1	102.4	113.8	131.5
	2	105.5	117.9	129.0
	3	108.9	118.2	141.8
	4	113.5	113.4	128.5
1942	1	117.9	110.0	128.4
	2	120.8	116.9	148.8
	3	122.1	124.6	160.8
	4	125.2	125.2	155.4
1943	1	124.2	129.6	153.3
	2	129.3	129.9	176.4
	3	128.3	129.4	170.4
	4	129.7	127.8	164.8

TABLE III (CONT'D.)

Year	Quarter	Consumer Price Index	Price Relative For Average Real Hourly Rate	Price Relative For Average Real Wage Payments
1944	1	129.0	127.8	166.4
	2	128.8	130.4	167.5
	3	129.9	132.6	168.4
	4	131.2	129.1	160.1
1945	1	132.1	127.1	162.3
	2	133.1	127.3	164.2
	3	134.5	128.1	141.3
	4	134.9	129.9	137.4
1946	1	136.1	132.0	142.8
	2	137.9	133.5	153.2
	3	149.9	131.6	141.8
	4	155.8	124.8	138.2
1947	1	157.3	138.1	157.5
	2	159.9	140.8	165.2
	3	163.5	141.5	157.3
	4	167.3	137.4	159.8
1948	1	171.9	135.4	161.2
	2	175.6	141.2	148.6
	3	178.1	140.3	158.3
	4	175.2	141.8	151.4
1949	1	174.1	141.6	149.0
	2	174.4	141.8	165.1
	3	173.8	143.9	157.1
	4	172.8	143.8	162.9
1950	1	173.3	142.8	150.0
	2	174.6	147.2	160.4
	3	176.1	152.6	166.1
	4	184.5	146.7	166.9

TABLE III (CONT'D.)

Year	Quarter	Consumer Price Index	Price Relative For Average Real Hourly Rate	Price Relative For Average Real Wage Payments
1951	1	189.6	143.4	160.5
	2	192.9	145.3	172.7
	3	193.7	151.8	164.9
	4	195.5	150.1	166.0
1952	1	196.9	149.0	170.9
	2	197.3	150.8	166.5
	3	197.2	154.5	173.6
	4	198.6	153.1	178.6

Source: The Consumer Price Index is published by the Bureau of Labor Statistics. The real wage data was derived from material supplied by the West Coast Lumbermen's Association.

From these figures it follows the coefficient of determination in each of the six situations is as follows:

Situation 1 ...	.992	Situation 4 ...	.949
Situation 2 ...	.987	Situation 5 ...	.878
Situation 3 ...	.961	Situation 6 ...	.906

Conclusions

As could be expected from an inspection of the graphs, the almost unbroken upward movement of the several series gives rise to the familiar ambivalence in possible interpretations which may be placed upon the correlations obtained. On the one hand, it has been shown that the simple fact of a general rising tendency in two series is sufficient to account for large correlations in and of itself. As a consequence, the correlations by themselves are meaningless, and in order to establish any sort of causal relation, a firm theoretical basis must be advanced.

As stated in previous discussions, this basis must lie in collective bargaining relationships and in those elements of the wage measures which are partially controllable by the employers. It must be that the Consumer Price Index is another of the factors which impel the two parties to take positive action in the direction of one wage policy or another. In the case of rising consumer prices, the union is under constant pressure from its

membership to negotiate increases in hourly money rates. The disparity between money and real wages, although not expressed in precisely those terms, is a close and pressing reality to the worker. If the laborer is not moved immediately to action by his own observations, he is sure to be prodded into it by a wife harried by rising grocery prices. In times of increasing consumer prices, the basic economic need of the worker for higher wage rates is a very real motive behind union wage demands.

The effect on average wage payments should not be nearly so profound, nor so closely related to increases in the Consumer Price Index. It goes without saying that any change in hourly wage rates will be accompanied by a proportionate change in average payments, provided all other things remain equal. However, in this instance, "other things" consist of such factors as the level of employment, total offerings of overtime hours, total offerings of straight time hours, etc., all of which may be readily changed at the discretion of the employer. The likelihood that management will act to offset fluctuations in average payments which are brought about by hourly rate variations is not plausibly dependent on movements of consumer prices. Rather, any action by the employer, either offsetting or reinforcing the effect

upon average payments of hourly rate changes, will depend upon several other economic magnitudes such as wholesale lumber prices, amount of industry product demanded, cost-price relationships, etc. A possible clue to what the employer may do in the above situation may be inferred from the fact that consumer prices and wholesale prices generally fluctuate together and never exhibit a long run tendency to move in opposite directions.[1]

In summary, it may be said that average hourly rates should be quite sensitive to a rising consumer price level. The lag, if any, between price level changes and wage reactions is undeterminable with present data, because it is only by comparing turning points that typical lags can be adduced. Since these data contain no real turning points, no lag period is deducible. Average payments also should be closely affected through the medium of hourly rate changes, but here the net effect depends upon employer reactions to other factors.

In the case of steadily falling consumer prices, the responses of the parties to collective bargaining are a little more obscure. As real wages increase (i.e., as the Consumer Price Index falls and hourly rates remain at

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[1]Compare and contrast the Wholesale Price Index and the Consumer Price Index, both of which are published in the: Monthly Labor Review (U.S., Bureau of Labor Statistics).

least temporarily stable) there certainly will be some pressure generated within the union to resist wage cuts. To the extent that this pressure is effective, a downward inflexibility in hourly rates will be introduced, and the size of the correlations between consumer prices and hourly wage rates will be considerably reduced. However, the direct pressure impelling resistance in this case would hardly be as great as the grass roots demand for action in times of rising consumer prices, because the economic reality of falling real wages comes much closer to home for the average worker than the more vaguely discerned case of rising real wages.

Any demand for reducing hourly rates which might come from management probably will spring from motives other than the falling consumer price level. Although the fact of rising real wages may easily become an employer argument for wage cuts, it is a fair presumption that the more important factors behind this demand will be such as those mentioned above--falling lumber prices, etc.--all of which may be expected to accompany any long term declines in consumer price levels.

Average wage payments should show a greater correspondence with falling consumer prices than average hourly rates. Again, this greater downward flexibility is

attributable to variables which are partially discretionary with the employer. However, for the same reasons pointed out above, the economic motives prompting management action will be only remotely connected with the fall in the Consumer Price Index.

It should be mentioned here that there are some cases in which the connection between the Consumer Price Index and wage rates is direct and automatic within certain limits. The reference, of course, is to those contracts which contain escalator wage clauses, and consequently are linked exactly to the Consumer Price Index. Any fluctuation in the level of consumer prices is automatically translated into a variation in the wage rate.[1] No such contract is in force in the Douglas Fir region at this time, but the existence of such wage clauses is an excellent example of how a recognized justification for wage rate increases can be lifted from the controversial atmosphere of the bargaining table and formalized in an institutionalized arrangement.

Synthesis

It is the belief of the writer that the following generalizations hold true.

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[1]Escalator clauses usually define a minimum change in the Consumer Price Index which must occur before the wage rate is altered. Also, a floor is usually placed on the extent to which wages can be reduced. For example, the

(1) There is a close functional relationship between the level of consumer prices and the measures of wages, when the Consumer Price Index exhibits a general upward trend. The relationship is more pronounced in the case of average hourly wage rates than in average wage payments, because of the indeterminacy of management actions which can influence the latter figure.

(2) When the Consumer Price Index is in a long term decline, the level of consumer prices will lose most of its effectiveness as a wage determinant. It is not improbable that declining consumer prices will be accompanied by falling wage payments and, perhaps, wage rates, but the reason for this coincident movement will lie in factors other than consumer prices.

Real Wages, 1937-1952

The purpose of this section is not a discourse on real wages in the lumber industry, which would involve the writing of another thesis, but simply to survey the changes in real hourly rates and real wage payments. In making this survey, it is hoped more light may be shed on the influence of changing real wage levels (or, if other things

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contract between General Motors and the U.A.W. provides for a one-cent change in hourly rates for each 1.14 change in the Consumer Price Index, provided wage rates may not be reduced after the Index has fallen to 164.7.

remain equal, what amounts to the same thing, changing price levels) on fluctuations in money wages. Inspection of Table III reveals several interesting facts. First, it will be noted that real average hourly rates have risen from about one hundred in 1939 to over one hundred and fifty in 1952. It will be noted further that this rise has not been smoothly progressive, but has come in discrete jumps. In nearly every case, these jumps have come at the end of a two to four quarter decline in real wages. This concatenation of events by no means proves anything, for it is entirely possible to argue that the changes in hourly rates were induced by factors completely extraneous to the falling real wage rate. On the other hand, it is certainly suggestive of the possibility that the combination of relatively stable wage rates and rising consumer prices will strongly influence the wage policies of union negotiators.

Second, the already apparent fact that average payments are more flexible than hourly rates is amply supported by the data contained in Table III. It will be noted that the range of average real payments is greater than that for real rates (97.2 to 178.6 as compared to 95.2 to 154.5); the upward progression of the former is broken by occasional large declines; and beginning in the

third quarter of 1938 an erratic twenty to forty point gap is opened up between real rates and real payments. While it is apparent that changes in money wage rates are reflected in variations in real payments,[1] it is also clear that at times other factors exert influences in the opposite direction. Since Table III shows most of the instances of major reversals in real payments to have occurred during the three periods of recession in business activity, it seems reasonable to assume that the countering influences consist of reductions in sawmill employment, overtime hours, and straight time hours. This lends some support to the conclusion reached earlier in the chapter, that the effect of a rising price level is not as direct in the case of average payments as it is in the case of hourly rates.

Third, it should be pointed out that the differential between average real payments and real hourly rates is not altogether what it seems on the surface. The existence of a differential is to be expected, if only because the number of overtime hours worked was appreciably larger throughout most of the interval 1941-1952 than it was during the base period, 1935-1939. However, the size of the difference appears larger in Table III than it would be if take-home pay were used rather than average

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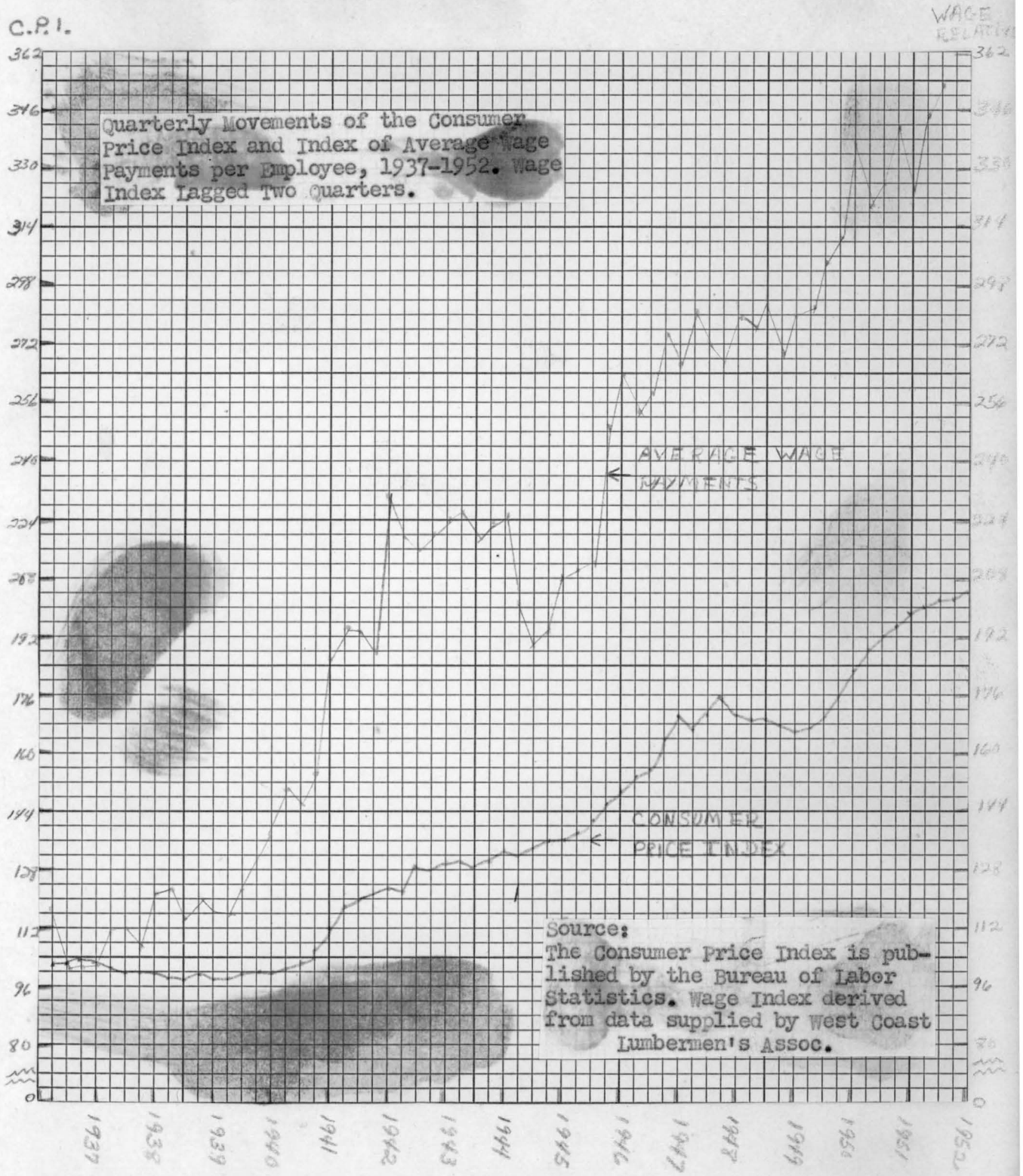
[1] Cf. fluctuations in real payments with dates when money wage rates were increased. The latter information is contained in Appendix "A."

payments. In other words, disposable real income is somewhat smaller than real payments. It would be an extremely complex task to compute a correction factor, and it is not sure that the greater accuracy would be worth the effort.

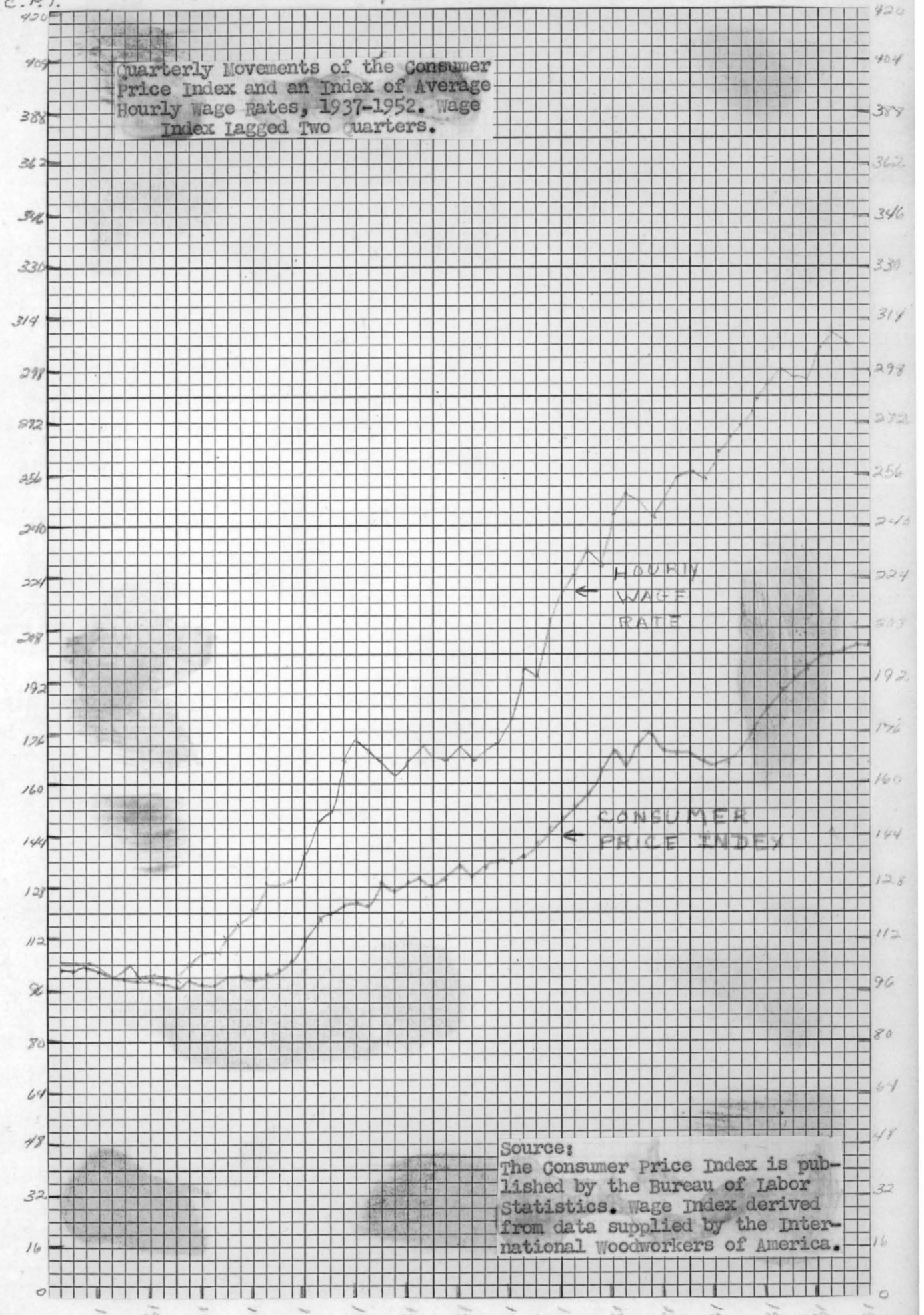
Conclusion

In the opinion of the author, the movements of real wages in the period under consideration offer some support to the theoretical conclusion that a functional relationship exists between consumer price variations and wage changes during long term rises in the Consumer Price Index. The lack of data concerning the reactions of real wages in the lumber industry to falling consumer prices precludes any analysis in that direction.

Graph IX


C.P.I.
WAGE RELATIVE
362
346
330
314
298
272
256
240
224
208
192
176
160
144
128
112
96
80
0
Quarterly Movements of the Consumer Price Index and Index of Average Wage Payments per Employee, 1937-1952. Wage Index Lagged Two Quarters.
AVERAGE WAGE PAYMENTS
CONSUMER PRICE INDEX
Source:
The Consumer Price Index is published by the Bureau of Labor Statistics. Wage Index derived from data supplied by West Coast Lumbermen's Assoc.
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952

Graph X



Quarterly Movements of the Consumer Price Index and an Index of Average Hourly Wage Rates, 1937-1952. Wage Index Lagged Two Quarters.

Source:
The Consumer Price Index is published by the Bureau of Labor Statistics. Wage Index derived from data supplied by the International Woodworkers of America.

CHAPTER VII

AVERAGE PRODUCTIVITY AND WAGES

The inadequacy of the marginal productivity theory as an explanation for variations in short run wage rates in the sawmill industry was demonstrated in Chapter III. In this chapter the writer proposes to examine the relationship between wages and a concept of average productivity in order to determine whether or not the latter offers a better explanation for short term fluctuations in wages than marginal productivity. In the real world of institutionalized, industry wide wage bargaining by agents representing large segments of both labor and management, it is the opinion of the author that considerations of average value product are likely to have greater influence over wage bargainers than the theoretical exactness of marginal productivity. This is so for several reasons. In the first place, it is a quantity which can be readily computed. At any given time price and average product are objective data which may be ascertained at will. On the other hand, unless perfect competition prevails, marginal revenue can only be imperfectly estimated, and marginal physical product can only be determined by freely

experimenting with different combinations of labor and capital--a procedure which few employers are willing to attempt. In the second place, this simplicity and ease of computation render the AVP a far more useful tool in the hands of the two parties to the wage bargain than would be the MVP. It is possible that a few individual negotiators are acquainted with the niceties of economic theory: but the writer feels it a fair assumption that for most of the bargainers as well as almost all of the rank and file on both sides, the subtle juggling of labor at the margin is simply not meaningful. On the other hand, the simple statement that the same number of men working the same number of hours have produced five per cent more or less in period "A" than in period "B" should be perfectly intelligible to nearly all of the participants. Since it is quite often the rank and file that must be convinced of the reasonableness of any given wage proposal, simplicity and ease of understanding are important factors in the determination of short run wage rates and wage payments. Finally, the average productivity explanation is not intended as a monolithic, determinant solution to wage questions, but will take its place as one of a congeries of factors. Each of these factors will exert some distinct, but not precisely quantifiable, influence on the collective determination of wages.

The measure of average value product was obtained in the following manner. The sum of man-hours worked in each quarter was divided into total production for each corresponding quarter. These quotients were then multiplied by the appropriate wholesale lumber price figure. The resulting series will be used hereafter to represent the AVP.

The two wage series which have been employed in the preceding chapters will also be used here.

The analytical method which will be used in this section is similar to that employed in Chapters IV, V, and VI. Accordingly the relative movements of the three variables--average hourly wage rates, average wage payments, and average revenue product--are plotted on Graph XI.

The coefficients of correlation were:

1. Average value product-average payments; no wage lag ..... .916
2. Average value product-average payments; six-month lag ..... .940
3. Average value product-average payments; one-year lag ..... .928
4. Average value product-average hourly rate; no wage lag ..... .934
5. Average value product-average hourly rate; six-month lag ..... .938
6. Average value product-average hourly rate; one-year lag ..... .944

The corresponding coefficients of determination were:

1.	...	.840	4.	...	.873
2.	...	.884	5.	...	.879
3.	...	.862	6.	...	.891

This graphic and statistical evidence shows a considerable degree of co-variation between average value product and wages. Graph III indicates a general agreement in such minor turning points as exist in the wage sequences, and a persistent upward movement during the period 1937-1952. The correlations confirm the visual evidence. Again it must be emphasized that the size of the correlations is not significant of itself; that the rising trend of both series may adequately explain the computed correlations.

Ba

Bases for Changes in the ARP

Generally, there are three variables which may affect the level of the average value product. The first is the effort put forth by the active labor force and the relative skill exercized by that body. In the short run, this factor should be quite stable, since it involves the educational and training levels of large groups of individuals. In the long run, it is possible that a secular trend may be evinced, either in an upward or a downward direction. The effect on the AVP of cyclical variations in employment is not altogether clear. If it is assumed

that management has absolute control of hiring and firing policies, then it probably would be fair to presume that average productivity varies inversely with the business cycle, as the least efficient workers would be the first to be laid off in a downturn and the last to be rehired as full employment is approached in an upturn. On the other hand, if the hiring and firing function is modified by joint union-management agreements such as seniority provisions applying to lay-off and rehiring policy, then fluctuations of average productivity over a cycle may be random.

The second is the capital-labor ratio. There are two aspects of this situation which require attention. If the "state of the arts" is given, there is an upward limit to any increase in average productivity. This limit is the optimum combination of capital and labor which must exist when both methods and forms of capital equipment are fixed. In this case the proportion between capital and labor would tend to settle at the optimum point, and fluctuations in average productivity will probably be confined to such exogenous factors as population changes and accidental destruction of capital goods. On the other hand, if the possibility of innovation is introduced into the model, no optimum combination is inferrable.

In this case, average productivity depends upon the character of the innovations and the speed with which they are introduced. It is obvious that any large scale, secular expansion in average productivity must depend upon a continuous stream of new methods, new products, and new capital equipment.

There may also be some cyclical variation in average productivity. For example, during the upswing those new building and innovational projects which may have been conceived during the depression phase, but which were deferred because of inadequate financial resources or because of the undue pessimism which normally prevails at such times, may be undertaken, so that capital accumulation may show a tendency to bunch up in certain periods of time. As a result, the increase in capital may outstrip the increase in population, which, in a dynamic situation, means an increase in average productivity. During the final stages of the upswing capital accumulation, including innovation, should tend to level off. Then, as population increases swell the labor force, average physical productivity should decrease. During the downswing, it is probable that tightened credit conditions and gathering pessimism will tend to discourage that capital accumulation which would otherwise occur. This coupled with continued

population growth should indicate a fall in average physical productivity. Another consideration here is whether increasing unemployment of labor is accompanied by a smaller than proportionate or greater than proportionate increase in unemployed capital. If the former, then the indicated fall in average productivity may be counteracted to some degree; if the latter, then the indicated fall may be reinforced.

Finally, the average value product may be affected by fluctuations in prices. To the extent that changes in AVP are engendered by price changes the succeeding analysis is very closely related to the analysis of the effects on wages of wholesale prices contained in Chapter IV.

A Theoretical Foundation

If only the case of average hourly wage rates is considered, it is clear that any influence exercized by the AVP on the determination of short run wage rates must be the result of the reaction of the several negotiating groups to changes in the average value product. The author can contribute one bit of evidence tending to support a conclusion that the AVP does influence at least one of the parties. In a private conversation with a policy making official of the International Woodworkers

of America[1] the writer learned that in estimating the profitability of firm and industry, one of the important elements considered by his union was increased "productivity." On inquiry, it came to light that his concept of productivity was a composite of increased product per employee and the value of this increase to the owners.

On the theoretical side, if union negotiators are aware of a secular or cyclical increase in average revenue product,[2] and if they interpret this as implying a concomitant increase in profitability, they will be strongly motivated to demand a part of this greater profitability in the form of higher hourly wage rates. To the extent that a rising AVP actually represents greater profitability, employer resistance to wage rate increases should be substantially weakened. At the same time, it is more difficult to justify a refusal to grant such increases.

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[1]Another aspect of this same conversation was reported in Chapter IV, above.

[2]The data from which average productivity can be computed are published monthly by the West Coast Lumbermen's Association, and consequently are readily available to the employee representatives.

Other things being equal, these two interacting forces should produce a negotiated increase in hourly rates. Such a conclusion is supported by the statistical evidence submitted above.

If a secular decrease in average revenue product is manifested, management will be driven to demand wage reductions. The union may wield enough power to prevent any reduction for a time, but the alternative will be unemployment as some firms lower their production levels and the marginal firms are forced from business altogether. The ultimate result will probably be a combination of reduced employment and lower wage rates.

The foregoing analysis should be equally valid for the relationship between AVP and average wage payments. Some supplementary analysis seems indicated, however. For example, as AVP increases there will be some lag between changes in the value product and changes in hourly rates. The correlations seem to point to a typical lag of nine months to a year. During this lag the employer is the sole beneficiary of the increase in productivity. If the decrease in unit costs is of sufficient magnitude, and if the demand schedule is relatively elastic (or if demand is increasing even if the demand schedule is inelastic) management will certainly increase the scale of production

to take advantage of the temporary cost reductions. Increasing production will entail expanding some or all of the employment variables--size of the labor force, straight time hours, and overtime hours. Thus, under the assumption stated, an increase in average value product should lead to higher levels of average wage payments. It is also conceivable that temporary cost increases may arise as the result of a lag between a fall in ARP and a wage decrease. Again, if the changes in unit costs are significantly large management may be expected to react by reducing some of the employment variables--overtime hours worked, at the very least--thereby reducing average wage payments.

Conclusions

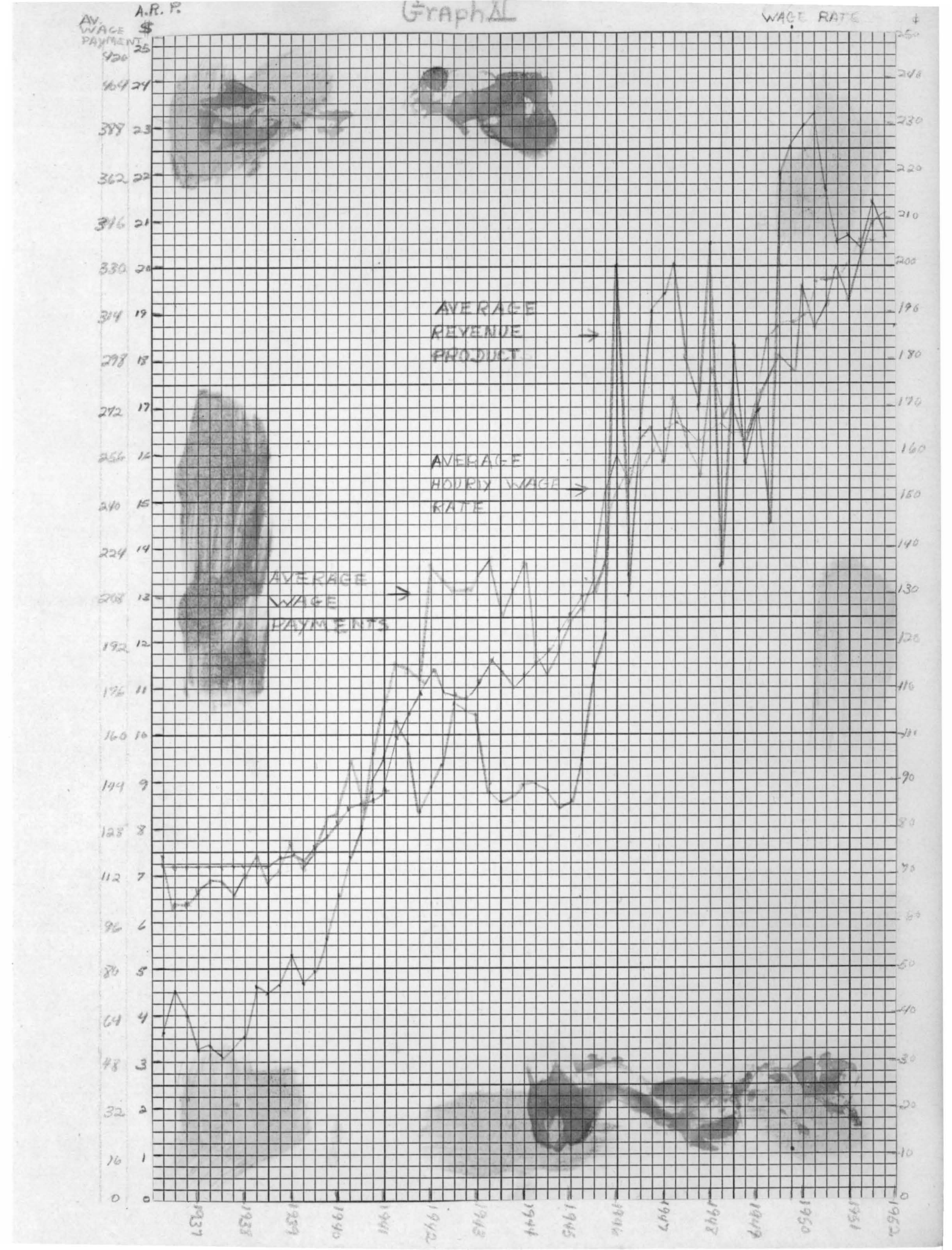
(1) The writer feels it is fair to assume that, for short run situations, changes in average productivity have a greater effect on fluctuations in hourly rates and average wage payments than do changes in marginal productivity.

(2) The statistical evidence tentatively supports the theoretical conclusion that movements in the AVP are reflected by changes in average hourly wage rates. The mechanism by which variations in AVP are translated into wage changes is the collective bargaining conference. It

has been shown that a concept corresponding to average value product is considered an important factor by at least one of the negotiating parties in the sawmill industry, and that it is therefore a subject for discussion at the bargaining table.

(3) The statistical evidence further supports the conclusion that average wage payments are similarly influenced. It is obvious that any change in hourly rates will cause at least a proportional change in average payments, provided other things remain equal. In addition, it is possible that in the indicated lag period between a change in the AVP and a change in the hourly rate, management may react to the temporary unit cost reductions (or increases) by expanding (or contracting) the scale of production. This process will usually involve increases (decreases) in the average wage payment; it will certainly do so if either straight time hours or overtime hours worked are expanded (or contracted).

(4) The average value product is one of several factors that are carefully considered by wage bargainers in formulating their wage demands. It follows that the AVP is a significant element in the determination of short run wage rates and wage payments.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CHAPTER VIII

SUMMARY AND CONCLUSIONS

Throughout this paper has run a thread of conflict: a question of which of two theoretical approaches most accurately describes a pricing process.

The Marginal Productivity Theory

One of these approaches is an essential part of the whole neo-classical explanation of economic activity. This, of course, is the marginal analysis, upon the foundation of which has been erected an imposing structure of necessary causal relations which purports to describe the entire complex operation of a capitalistic economy. In order to explain the logical pattern which they discover in society, the adherents of the theory postulate a rational, straight thinking "economic man" as the prototype of all individuals. In order to explain the predictable manner in which they perceive businessmen to act, these theorists erect the profit motive into a position of unique eminence as an incentive for all business activity. So that irrational or ignorant men may not upset the logical coherency of the system, the theorists assume an automatic enforcement device which they call perfect competition.

With these three building blocks, some neo-classical and contemporary theorists raised up a determinate, automatic, and morally satisfying model of the economic relations of man. It is determinate because all questions of what, how, and how much are capable of being answered with a charming exactitude. Given the relevant economic schedules, production, consumption, distribution, price, cost, and income for firm industry or nation may be computed down to the last cent of factor income or the last unit of production. It is automatic because no individual or firm can long stray from the plainly marked paths without incurring fatal financial losses. It is morally satisfying because it predicts not only what any economic magnitude will be in fact, but also what it ought to be as a matter of moral right. Thus labor should receive as its distributive share the value product which is attributable to the marginal worker. Any less is exploitation, and labor, since it is perfectly mobile and has perfect knowledge of all other job opportunities, will naturally seek greener pastures. Any more will force the marginal employers from business, and the competitive pressure from unemployed workers will impel a fall in wages.

In recent years, the development of oligopoly theory has brought some considerable modification to the

marginal analysis, especially in the field of commodity price and production theory. The introduction of areas of discretion for employer decisions, the recognition of non-price competition in vast areas of industrial activity, the adumbration of industry practices such as price leadership, basing point systems, market sharing agreements, etc., all have combined to lessen the hold of the earlier neo-classical theory of the professional mind. Even in this form the marginal analysis has discarded only one of its building blocks. The hoary old ghost of the "economic man" lingers still, and the profit motive has been elevated above perfect competition as the device which ensures conformity.

When attention is turned to wage theory, it is as if the pages of economic history were turned back. The marginal productivity theory is still the only generally accepted explanation of wage determination. The institutionalization of the job market and the process of collective bargaining are still looked upon by most economists as excrescences on the economic body. The marginal productivity theory is still taught in many Principles and elementary theory classrooms as the ultimate in wage theory; and it is still gospel in many Principles texts. An excellent example is the elementary text which

has been in use at the University of Oregon for the past two years. The connection between wage theory and union bargaining is expressed as follows:

> The economic advantages of union intervention are two: the exploitation of laborers is ended by making the wage equal to the value of the labor, and employment in the area is increased to what it should be. In other words, assuming the union to demand a wage rate neither lower nor higher than [the value product] the wage rate and the volume of employment in the area are what they would be if there were pure competition. . . .[1]

This same text lists the disadvantages of union bargaining as the promotion of unemployment, the reduction of investment incentives, encouragement of price inflation, the possible degeneration of the union movement into a class struggle, and the possibility that union-management relations will result in a collusive plot to defraud and exploit third parties.[2] The only escape which the text offers from this terrible dilemma is voluntary restraint on the part of the bargainers or social control by government to guarantee that the substance if not the form of the marginal productivity theory is observed in the wage markets.[3]

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[1]Bruce W. Knight and Lawrence G. Hines, Economics (New York: Alfred A. Knopf, 1952), p. 488.

[2]Ibid., pp. 488-92.

[3]Ibid., pp. 491-92.

In the same vein, it will be noted that the best explanation for the demand for factors of production which one standard theory text can offer is a slight modification of the traditional marginal approach.[1]

For all intents and purposes, the marginal productivity theory reigns supreme in the field of wage determination, although many of its adherents have retreated to a winter line which emphasizes the normative rather than the determinate aspects of the theory. Today it is fairly obvious, even to the devout, that the theory cannot be applied with great exactitude. However, this in itself is not sufficient reason to reject it absolutely. Even theory is a generalization, and it is characteristic of all generalizations that they do not describe reality with perfect accuracy. To do it full justice, the marginal productivity theory must be examined closely to discover if it is a reasonable approximation of the real world. If its assumptions and the results it yields can be accepted without doing undue violence to fact, then it is, in some sense, a useful tool. If, on the other hand, it is based on assumptions which are so fanciful as to cause it to yield grotesque results, then it deserves nothing better than the economic scrap heap.

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[1]Boulding, Economic Analysis, pp. 701-7.

Application of the Theory to Practical Wage Determination in the Short Run

At least three distinct versions of the marginal productivity theory as a determinant of wage rates have been advanced.

(1) The pure statement of the original theory, which is used above, is a distillation of the early work of such diverse individuals as J. H. von Thunen, Eugen von Bohm-Bawerk, Knut Wicksell, William Jevons, J. B. Clark, and many others who labored between 1842 and 1920. At least until 1910 it was an article of faith with orthodox economists, and it survives today in the minds of many as the normative value to which wage rates should conform.

In this form marginal productivity has been applied to the theory of the firm and has been advanced as an explanation for short term wage and employment phenomena. Today, however, it is no longer possible to maintain that short run wage rates are determined by the necessity for the employer to adhere to the margin or perish economically. The attempts in Chapter III to compare the marginal value product with wage rates in sawmills are an example of the errors which arise when the theory is rigidly applied to a specific industry. The reason for these errors lies principally in the unreality of the assumptions which

surround the theory. Because of them, it is not equipped to deal with such things as collective action in the wage field, industries which are less than perfectly competitive, the dynamic expansion of a firm or industry, or a host of other situations which are invariably present in a real economy. The investigator is driven to the conclusion that, in spite of its wide currency, the theory does not describe well the practical process of wage setting in the short run.

(2) The first retreat from this forward line, and a bastion still defended by many economists,[1] was the admission that institutional forms might alter wage patterns for an indefinite length of time. In this form literal determinacy is abandoned, but the moral element is retained. If man, in his monopolistic wickedness, wishes to tamper with the natural functioning of the economy he must also be prepared to accept the consequences. The punishment for this kind of tinkering, insofar as it affects labor, is a prolonged, vitiating hard core of unemployment. Such a conclusion might be entirely justified if the national economy were fashioned along static lines. As it is this

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[1]See, for example: Simons, Economic Policy for a Free Society, Chapter 1. See also: Lindblom, Unions and Capitalism.

version of the theory is unreal in several respects. In the first place, it bases its postulate of necessary unemployment on the existence of product competition close enough to perfect so that employers could not pay wages above competitive levels without being forced from business. With the rise of oligopolistic conditions this conclusion no longer holds. Under conditions of imperfect competition it is entirely possible for a firm or industry to pay above "normal" wages provided only that, either through ignorance or design, it is willing to accept less than a maximum net revenue. In the second place, in a dynamic economy which is in an expansionary phase, the hard core of unemployment may simply serve as a labor pool from which needed workers will be drawn more or less rapidly by new and/or expanding industries. At least during the first stages of a contractionary phase, it is doubtful if any practicable reduction of wage rates would lower total costs sufficiently to dispel the air of extreme pessimism which inevitably accompanies a depression. Finally, the assumption that the profit motive is unique as a prime mover of businessmen cannot be accepted without criticism. Especially when applied to the field of wage determination, where personality, the vagaries of human emotions, and the vast complex of non-pecuniary human needs are vitally

important, the assumption that men are motivated exclusively by the desire for monetary self aggrandizement is inadmissible. All this is not to say that "excessive" wage rates never can give rise to semi-permanent unemployment: it is simply to point out that such a case is merely one of a number of equally distinct possibilities.

Application of the Theory to Wage Determination in the Long Run

A far more realistic statement of the theory is one which emphasizes the very long run influences which it has upon wage processes. To requote Paul Douglas on this point:

> No one who understands the productivity theory claims that it works with mathematical precision. It is enough if it is a broad and powerful tendency which brings wages into some sort of close conformity to it.[1]

It is the belief of the author that in this form the marginal productivity theory is on much more solid ground. In at least two ways, competition should become more effective as an enforcement device as the period of time under consideration is lengthened. In the first place, the marginal firms in an industry will gradually be forced to reduce their scales of operation if wages are long maintained above competitive levels. Some of these firms

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[1]Douglas, The Theory of Wages, p. 77.

may actually be forced to retire from the business arena. The time period required to accomplish these results (especially the latter) very well may be measured in decades, because of such considerations as large accumulations of fixed and highly durable plant and equipment, personal attachments to a particular industry, lack of alternative opportunities that do not require personally distasteful geographical or social changes, etc. Any unemployment which accumulates during this period should bring about two results: (a) the marginal product will be raised; and (b) the pressure exerted by unemployed union members will gradually increase until it becomes a powerful force in internal union politics. At some point this pressure will probably grow strong enough so that the union will accept a negotiated wage decrease. Between these two forces the wage rate could conceivably be brought "into some sort of close conformity to" the MRP.

The second method by which competitive pressures should wax more powerful as time progresses is through the unanticipated introduction of new competing products or the improvement of old competing products. In the opinion of the author this is the more compelling force of the two under discussion, for it vitally affects not only marginal firms, but the entire industry. If oligopoly

conditions prevail, and if only competition within the industry is considered, it is entirely possible that many firms may pay higher than competitive wage rates. That is, internal competition, in this case, does not require that all firms adhere to the margin. On the other hand, the threat of a new competing product is generally felt throughout the industry, and it may well be that the effect will be more pronounced in the case of the low cost firms than in the case of the marginal firms. At any rate, this potentially destructive competition from outside the industry will probably cause alterations in price and wage policy within and throughout the industry.

Another advantage of this form of the theory is that it has been able to discard the assumption that the marginal value product is solely a pecuniary value and that it is precisely quantifiable. Fritz Machlup, in a notable attempt at a reconstruction of wage theory, has introduced the concept of a subjective measurement of the marginal value product by the individual employer. According to this modification innumerable long range and sometimes non-monetary factors may affect the opinion of each employer concerning the value of the marginal product, and as a consequence wage and employment levels are not objective quantities which may be read from schedules.

In Machlup's hands marginal productivity is no longer determinate, no longer automatic, and no longer has an ethical flavor. Rather, it is a restatement of the maximizing principle inherent in the earlier forms of the marginal analysis: that employers will tend to maximize their net return, but in terms of what they think is a maximum. The really significant thing about this modification is that the employer is no longer represented as seeking to maximize his net monetary return only, but net return from all sources, monetary and psychic. If this be true, it follows that the figure toward which wage rates are constantly being bent is not susceptible to objective computation, but consists of a range within which the existing rate must fall.

While this latter form of the theory has many advantages in that it is more closely related to reality, it still suffers from a number of limiting assumptions. It was shown in Chapter III that perfect competition is not necessary to the operation of the marginal productivity theory, but that in discarding this assumption some of the precision of the theory is sacrificed. The profit motive, if cast in long run terms and if subjective, essentially non-monetary elements are allowed within its framework, is the basic and most defensible assumption upon which the

theory is based. Even granted this most favorable statement of the principle of profit maximization, it must be recognized that under certain circumstances individuals will not always be guided by it.

There are, however, three assumptions of the theory which cannot be even approximately squared with the real world. The theory suffers from the universal refusal of classical and neo-classical theorists to recognize the possibility of long periods of unemployment. During such periods much of the analysis of the marginal productivity theory does not apply. Likewise, the assumption of fluid input and commodity prices suffers from a lack of realism. Bilateral organization of the job markets and oligopoly conditions in the output market make for a certain rigidity in wages and prices, especially in the downward direction. This lack of flexibility means that the process of establishing an equilibrium which the theory describes will be partially or wholly frustrated. Finally, the theory assumes a series of static conditions that put it far out of touch with the realities of the American industrial situation. Unchanging demand, constant technical functions, and invariant supply conditions simply do not describe the typical American industry.

The Bargaining Theory of Wages

The alternative approach to wage theory is the bargaining theory. At the outset this theory abandons all pretense to the three canons of desirability that have so recommended the marginal approach to so many people--precise determinacy, automaticity, and the connotations of normality. The bargaining theory presupposes not a single equilibrium rate, but a range of possible rates, any one of which is theoretically feasible. There are rather definite lower and upper limits to this range. The minimum rate is that level of real income which is customarily required for the mere subsistence of the worker and his family. As the use of the word "customarily" implies, this level is not fixed precisely for all places and all times. Even Ricardo recognized the existence of geographical and temporal differences in the subsistence level, largely determined by the habits and customs of the different peoples.

The upper limit is set by the minimum return which the suppliers of other factors will accept without reducing the flow of these services to the point where aggregate real income begins to decline. In a competitive system this upper limit would be set by the marginal product of labor, but the bargaining theory assumes an industrial

society in which non-competitive, institutional wage determination is the rule. As a consequence, the concept of minimum return need not be defined strictly in terms of marginal return.[1]

The bargaining theory is essentailly a short run explanation of wages. It deals primarily with those several elements which may affect the attitudes and actions of the individuals engaged in the negotiation of wage rates. Accordingly, the bargaining theory holds that the key to short run wage determination lies in the bargaining process between collective representatives of labor and management. The wage rate which will be set will be the resultant of many forces. The relative economic strength of the two parties is a significant, but not as some have supposed, an all important factor. The relative bargaining

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[1]For example, the concept of "normal" returns to capital is in nowise fixed. In the last generation interest rates have been more than halved without any apparent diminution in the flow of safe investment money. The U.S. News and World Reports (March 1, 1946) cited the following declines in interest rates:

	1920	1946
Federal Government Bonds	5.3%	1.5%
Corporation Bonds	7.0	2.8
Home Mortgages	7.0	4.5
Savings Accounts	3.0	1.0
Common Stock	6.2	3.5

skill of the two parties may have considerable influence on the rate which is finally agreed upon. Subjective attitudes, feelings, and prejudices on the part of individual participants in the bargaining process may affect the final outcome. Finally, a congeries of objective factors constitute the specific weapons or arguments which are employed at the bargaining table. Insofar as they are nothing more than ammunition for a sham battle whose true origins lie in some other direction, they cannot be said to have any great force as wage determinants. But insofar as these objective factors touch basic economic motives, they are likely to be major influences on the agreed rate. In this paper the author has presented four such factors.

The direction of change of wholesale prices for Douglas Fir lumber should have decided effects on the bargaining process. Rising prices spur union negotiators to demand higher rates, and at the same time they weaken employer resistance to wage increases. Falling prices weaken the basis for union wage demands, and coincidentally strengthen enormously the will of the employer to resist new wage demands. The duration and intensity of the decrease in prices will determine whether or not it will form the basis for actual wage rate decreases. Average wage payments should move in the same direction as hourly

wage rates. Since they appear to be more flexible than hourly rates, it is probable that responses to changes in wholesale prices will occur three to six months earlier for the average payments figure.

The relative movements of the amount of industry product demanded, as measured by new orders at the millsite, presumably would have wage effects similar to movements of wholesale prices. In some situations it was found that better explanations of wage phenomena could be obtained by using an unfilled orders series rather than new orders as the measure of amount demanded.

Upward movements of the Consumer Price Index should be a powerful stimulant to union negotiators to seek wage rate increases which will counteract the falling level of real wages. The pinch of rising consumer prices is one thing calculated to rouse widespread grass roots support for the negotiating committee. Falling consumer prices would probably have little effect on the determination of wage rates, for it would have small effect on the economic considerations of the employer qua employer. The effect of consumer prices on average wage payments should be felt chiefly through changes in the hourly rate.

Finally, changes in the average value product should have a distinct influence on short run wage setting. When

the AVP is rising, both hourly rates and average payments should increase. The rates should rise because employee representatives will demand a share in the greater profitability of the firm or industry, and that greater profitability will weaken employer resistance to reasonable increases. Average payments, of course, will increase any time hourly rates rise, provided man-hours worked do not decrease. It also seems probable that, because of a demonstrated difference in the lag period between changes in the independent variable and changes in the two wage measures, average payments should rise even before hourly rates are revised. This is so because the employer should expand his scale of production as his cost curves are lowered, and thus reap profits which will be higher in the period before hourly rate revision than after.

What will happen if the average value product falls is not so clear. Of course, if the fall is secular the only possible result is eventual cuts in employment or wage rates or both. On the other hand, a short term decrease might be expected to have little or no effect, since the stickiness of wages in a downward direction should outlast the temporary fall in average revenue product.

Statistical findings in this study offer considerable confirmation for the theoretical discussion above.

In the Douglas Fir region, and for the period 1937-1952, changes in wages rates and average wage payments in sawmills very closely paralleled movements of the four variables indicated. Through the construction of comparative graphs and the computation of linear correlation coefficients, a very high degree of co-variation was demonstrated between wages and the other variables. However, this evidence is suggestive rather than conclusive. In the absence of comparable statistical series prior to 1937, it was impossible to include in this study data stretching over a full business cycle. As a consequence, it is possible to argue that the correlations between the data are explainable by the simple fact that all the series exhibit marked and scarcely interrupted upward movements. Until such time as additional data are available, conclusive evidence based on the material contained in this paper cannot be brought forth.

It is quite probable that forces, other than those examined herein, exert powerful influences on the determination of wage rates. One of these assuredly would be the profitability of the firm and industry. Experimentation with a multiple correlation analysis should establish which combination of the objective factors is most valid. When sufficient additional information is available, it

is the opinion of the author that this sort of analysis, combining those determinative elements which seem most powerful, would yield much significant evidence concerning the determination of short term wage rates.

General Conclusions

The writer believes that the material adduced in this paper warrants the following general conclusions.

(1) In a modern industrial society the marginal productivity theory cannot adequately explain short term movements in wage rates.

(2) Subject to the limitations imposed by the scope of this study, these short run movements can be better defined in terms of a complex of factors, not all of which are quantifiable. It follows that individual wage rates are not precisely predictable, but may be established within a wide range of possible rates. For any particular rate the investigator can narrow this range by a prediction based on a multiple correlation of the several objective factors, and an intelligent judgment concerning the effect of the non-quantifiable elements.

(3) If expressed in very long run terms the marginal productivity theory is probably the best available explanation of the movements of wage rates over long periods of

time. In one sense the marginal productivity and bargaining theories are complementary: the former can most adequately explain the reasons for long range tendencies in wage rate movements; the latter can more accurately explain the process of wage determination in the short run. Even in the long run, however, some of the assumptions upon which the productivity theory rests restrict its usefulness as a descriptive device. The theory may best be used as a conceptual tool or a framework upon which to base all theoretical investigations.

(4) The statistical evidence which was presented herein tends to support the conclusions that the objective factors which were investigated exert a positive influence upon the determination of wages in the short run. Theoretically each of these factors--wholesale lumber prices, demand for lumber at the mill, consumer prices, and average productivity per employee--enters into the calculations of one or both of the parties to the bargaining process as a funadamental element. To some degree each has a distinct effect upon the wage rate which will be set by the bargainers. The correlations which were derived (as well as other statistical material which was brought out) indicate that this effect was large and decisive, but great caution must be used in interpreting these results.

Throughout the period under discussion all the various series exhibited generally rising tendencies, with only a few weak reversals of trend and no major turning points. The close correlations obtained, then, may be merely a function of the upward tendencies of the several series.

(5) This study contains one major flaw. The data cover only one phase of a business cycle. As one result the statistical evidence contained herein must be considered tentative rather than conclusive. As a second consequence any attempt to use the multiple correlation technique to relate the quantifiable variables to wages would not have been worth the extra effort, since, in the absence of data for a full cycle, it would be no more meaningful than the simple linear correlations which were used instead.

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APPENDIXES

APPENDIX A

CHRONOLOGICAL CHANGES IN MINIMUM BASE WAGE RATES IN DOUGLAS FIR REGION 1936-1952[a]

Effective Date	Minimum Base Rate
April 1936	$0.55
April 1937	0.625
April 1938	(Same)
April 1939	(Same)
April 1940	0.675
April 1941	0.75
April 1942	0.825
December 1942	0.90
April 1943	(Same)
April 1944	(Same)
November 1945	1.025
December 1945	1.05
April 1946	1.10
December 1946	1.25
April 1947	1.325
April 1948	1.45
April 1949	(Same)
May 1950	1.525[b]
September 1950	1.575
April 1951	1.70
April 1952	1.775

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[a]Source: International Woodworkers of America-CIO; Department of Education and Research.

[b]The IWA-CIO took this increase in the form of employer contributions to a health and welfare plan. The LSW-AFL received an equivalent money wage increase.

APPENDIX B

QUARTERLY CHANGES IN AVERAGE HOURLY WAGE RATES[a] IN THE DOUGLAS FIR REGION-1937-1952[b]

	Average Hourly Wage Rate in Dollars			
Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1937	$0.659	$0.726	$0.727	$0.729
1938	0.728	0.725	0.721	0.727
1939	0.723	0.724	0.726	0.726
1940	0.733	0.733	0.734	0.765
1941	0.791	0.845	0.874	0.874
1942	0.881	0.959	1.033	1.065
1943	1.093	1.141	1.127	1.126
1944	1.12	1.14	1.17	1.15
1945	1.14	1.15	1.17	1.19
1946	1.22	1.25	1.34	1.32
1947	1.475	1.529	1.571	1.561
1948	1.581	1.683	1.697	1.687
1949	1.674	1.68	1.698	1.687
1950	1.68	1.745	1.825	1.838
1951	1.846	1.903	1.997	1.993
1952	1.992	2.021	2.068	2.064

[a]This rate includes overtime and shift differantials.

[b]Source: International Woodworkers of America-CIO; Department of Education and Research.

APPENDIX C

AVERAGE EARNINGS PER EMPLOYEE[a] PER MONTH IN SAWMILLS OF THE DOUGLAS FIR REGION; BY QUARTERS 1937-1952[b]

Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1937	$100.28	$119.24	$111.33	$ 97.58
1938	98.74	100.68	109.75	109.60
1939	107.48	114.97	116.85	111.53
1940	113.27	117.49	116.97	122.56
1941	130.96	132.31	150.11	141.92
1942	147.28	174.74	190.90	189.18
1943	185.12	221.86	212.59	207.92
1944	208.66	209.76	212.70	204.19
1945	208.52	212.52	184.81	180.17
1946	189.07	205.44	206.72	209.45
1947	241.02	256.80	250.17	259.93
1948	269.48	253.71	274.17	257.94
1949	252.31	279.97	265.48	273.80
1950	252.71	272.29	284.42	299.54
1951	296.07	323.92	310.61	315.53
1952	327.34	319.44	332.91	344.91

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[a]Production employees only are included. The dollar figures represent payroll credits, rather than take home pay.

[b]Source: West Coast Lumbermen's Association, Industrial Facts Department.

APPENDIX D

AVERAGE WHOLESALE PRICES FOR EIGHT TYPES OF DOUGLAS FIR LUMBER, F.O.B. MILLSITE, AVERAGE FOR EACH QUARTER 1937-1952[a]

Dollars per 000 Board Feet

Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1937	$23.20	$24.15	$23.42	$21.00
1938	19.73	19.57	19.77	19.75
1939	20.21	20.23	20.96	22.85
1940	22.01	21.24	25.53	29.12
1941	29.73	29.44	30.92	34.79
1942	37.58	37.63	37.74	37.74
1943	37.73	38.59	39.10	39.14
1944	39.27	40.62	40.95	39.27
1945	39.25	40.24	40.24	39.27
1946	40.46	46.66	50.56	52.49
1947	54.48	62.10	65.31	69.71
1948	71.81	74.37	75.09	68.92
1949	63.41	61.64	59.93	60.78
1950	64.33	75.88	91.17	83.23
1951	85.87	85.60	83.04	82.77
1952	83.13	85.07	84.19	81.72

[a]Source: Bureau of Labor Statistics, Wholesale Price Index.

APPENDIX E

UNFILLED ORDERS AT MILLSITE FOR DOUGLAS FIR LUMBER, BY QUARTERS 1937-1952[a]

000,000 of Board Feet

Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1937	1277	1442	1179	854
1938	1027	1026	1056	1137
1939	1528	1818	2132	1780
1940	1889	1992	2279	2264
1941	2481	2927	2963	2659
1942	2949	3474	3470	3331
1943	3122	3688	3685	3625
1944	3770	3769	3796	3655
1945	3858	3736	3508	2550
1946	3039	3082	2908	4077
1947	3588	3746	3852	3929
1948	3853	3607	3459	3803
1949	3280	4049	3791	3959
1950	4709	5237	5061	5116
1951	5171	4892	4567	4588
1952	4900	4551	4759	4406

[a]Source: Derived from data supplied by the West Coast Lumbermen's Association, Industrial Facts Department.

APPENDIX F

AVERAGE NUMBER OF PRODUCTION WORKERS ACTUALLY EMPLOYED IN SAWMILLS IN THE DOUGLAS FIR REGION; BY QUARTERS, 1937-1952[a]

Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1937	15,649	17,371	17,654	14,070
1938	13,600	13,857	14,167	13,751
1939	13,844	14,942	15,290	16,076
1940	15,547	16,064	17,136	16,811
1941	16,461	16,961	17,182	16,527
1942	16,893	16,663	15,585	14,852
1943	13,503	13,553	13,761	13,788
1944	16,676	17,354	16,446	15,548
1945	15,078	14,228	13,481	9,526
1946	13,423	13,721	13,752	14,337
1947	15,559	16,287	16,925	16,625
1948	17,029	17,443	19,816	20,217
1949	19,710	19,978	19,756	19,431
1950	19,126	20,463	20,504	20,183
1951	20,409	21,665	21,430	21,244
1952	20,757	22,044	22,712	22,671

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[a]Source: West Coast Lumbermen's Association, Industrial Facts Department.

APPENDIX G

AVERAGE PHYSICAL PRODUCT PER MAN-HOUR IN SAWMILLS OF DOUGLAS FIR REGION; BY QUARTERS, 1937-1952[a]

	Board Feet			
Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1937	164	185	171	160
1938	168	165	168	177
1939	233	232	227	228
1940	219	235	222	222
1941	243	264	281	278
1942	267	265	224	238
1943	244	272	267	264
1944	224	212	212	226
1945	227	221	211	218
1946	239	242	238	390
1947	248	266	293	276
1948	282	252	229	298
1949	215	294	263	274
1950	229	295	301	282
1951	271	254	246	247
1952	245	247	247	221

[a]Source: Derived from data supplied by West Coast Lumbermen's Association, Industrial Facts Department.

APPENDIX H

SHIPMENTS OF DOUGLAS FIR LUMBER FROM THE MILLSITE BY QUARTERS, 1937-1952[a]

000,000 Board Feet

Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1937	1257	1677	1374	913
1938	986	1043	1146	1082
1939	1455	1679	1842	1615
1940	1651	1906	1929	1868
1941	1927	2256	2560	2128
1942	2342	2690	2200	2014
1943	1758	2164	2122	2113
1944	2095	2053	1906	1870
1945	1897	1739	1429	945
1946	1493	1627	1384	2624
1947	1892	2221	2197	2433
1948	2401	2093	2092	2602
1949	1878	2887	2430	1992
1950	2381	2933	2702	2789
1951	2780	2710	2356	2462
1952	2591	2501	2725	2364

[a]Source: West Coast Lumbermen's Association, Industrial Facts Department.

Typed by: Mrs. Lois K. Robbins