

## WAGES AND PRODUCTIVITY\*

CURRENT interest in economic matters often focuses upon developments and prospects short run in nature. Employment prospects during the next few years, the likely course of prices over a short period of time—these and similar issues merit and receive detailed attention. Concern with economic events that are to occur in the near future is natural enough. Quite often the events of the immediate future seem to have the most practical significance to us all. Nevertheless, there has been, of late, increased interest on the part of professional economists in longer-run issues.

In particular, the prospects for economic growth over long periods of time are being subjected to detailed analysis. This interest in longer-run issues reflects a renewal of interest rather than a new line of inquiry. Economists of other generations centered their investigations on basic economic forces the effects of which might be felt only over very long periods of time. For example, David Ricardo and his contemporaries regarded the operation of market forces with only passing interest and centered most of their efforts on an analysis of long-run equilibrium. Karl Marx, who borrowed so heavily from Ricardian value theory, tried to establish immutable socio-economic laws which would explain the course of economic events over centuries.

In fact it is rather more difficult to explain why the interest of economists in long-run matters ever slackened than to account for the present interest in the factors influencing economic growth.

Whatever the underlying reasons for the emphasis on

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short-run analysis, there seems to be little doubt that the great depression of the 1930's played a major role in shifting the attention of economists to short-run problems. In the face of a cyclical movement of unparalleled severity, longer-run problems seemed to shrink in significance. Many economists came to accept Keynes' half-facetious observation that "in the long run we are all dead." However, the pendulum which swung so far in the direction of short-run analysis in the 1930's seems to be swinging back once more. While contemporary economists are not prone to ignore short-run issues, a considerable measure of the work currently being done centers upon the requirements for and conditions of economic growth over long periods of time.

Economic growth refers to the secular *trend* of crucial economic time series. Growth may, of course, be negative although experience in this country has not shown other than an upward progression in our ability to produce goods and services. This record of past performance is perhaps largely accountable for the appearance of optimistic predictions that, in this country at least, we may look forward to an "economy of abundance." These forecasts of "abundance" are rarely the handiwork of academic economists, who are rather cautious in their pronouncements as to the future. But outside of academic circles, there is frequent reference to "abundance" as the end-product of economic growth.

What are the prospects for an economy of abundance? First, one can scarcely neglect the fact that—for the world economy—*scarcity* rather than abundance is still the predominant characteristic. While our own students are exposed to economic writings which treat Thomas Malthus as a pessimistic English parson whose predictive powers were negligible, I wonder whether students of economics in vast areas

of the world can accept this judgment in good conscience. For outside of the Western World there are only isolated areas where the pressure of population on resources is not acute. In those areas less fortunately endowed with material advantages, abundance refers only to the numbers of mouths to be fed and the phrase "economy of abundance" appears in the propaganda arsenal as an exhortation for revolutionary action rather than as an objective description of future prospects.

It seems clear that the prospects for abundance are rather limited geographically. But what of the prospects for the American economy—demonstrably the world's highest income region? Here too, one must be cautious. Past growth in material performance seems to have brought with it accelerated growth in the community's demand for goods and services. Before we enter into the land of milk and honey it may be necessary for there to be a slackening in what we demand. The probability of this occurrence is not large. Successive generations are not only born into a society with enlarged economic capacity but enter that society with (or soon develop) greatly enlarged appetites. Paradoxically enough, later generations may live and die in an economy of abundance without ever knowing it. This is as it should be from a narrow economic standpoint—growth in the ability to produce seems to require that the demands of the community be rising somewhat faster than the capacity to produce.

For these reasons and others, the phrase "economy of abundance" turns out to be a non-operational concept. I would substitute "economic growth" for "economy of abundance." The prospect for economic growth is far less controversial. Even so, the host of interrelated factors which are basic to economic growth defy neat separation.

I shall limit my observations this afternoon to the part that wages and productivity may play in economic growth. In addition to disclaiming any effort to examine in detail factors *other* than wages and productivity which may influence economic growth, I should like to ignore the connection (if any) between economic growth and what we might term social progress. Whether or not we collectively become better men and women as we achieve higher levels of material performance is at best conjectural and an issue upon which I do not wish to hazard a guess. The reason for this reluctance is simple enough. Economists may be capable of dealing with economic performance but have no special qualifications to pass judgment on matters which are non-economic. This reluctance should extend to the future as well as the past. Therefore, I am as unwilling to correlate future American economic growth with social progress in the broadest sense as I would be to deprecate Hellenic civilization because the Greeks were not overly adept at fiscal policy.

Even this wholesale exclusion leaves us with an abundance of controversial issues. I should like to separate the discussion of the role of wages and productivity in economic growth into the following divisions. First, it is necessary to examine some aspects of the historical behavior of wages and productivity. Second, it will be desirable to appraise the theoretical explanations which economists present for wage-productivity behavior. Third, I will comment upon some recent developments in the use of wage-productivity data in the collective bargaining process.

#### HISTORICAL WAGE-PRODUCTIVITY BEHAVIOR

Suppose that we had an accurate index of productivity (the volume of output produced by one hour's labor). If the

ratio of output to man-hour inputs shows an increase, the economy is more productive in the sense that a larger volume of output (however distributed) is attainable with a given labor input. This we may term the productivity effect. There is a temptation to treat long-period increases in productivity as presumptive evidence that the economy is better off, i.e., that there has been an increase in economic welfare. While I, personally, am prone to regard increases in productivity as desirable, it is not legitimate to regard increases in the productivity ratio as conclusive evidence of increasing economic welfare. Two major points should be stressed.

First, the productivity ratio is a measure of efficiency not totally unlike engineering efficiency ratios. Like other machines the economic system may operate at various speeds. But when the economic system runs at slow speed (during periods of deep depression) its efficiency (as judged by the productivity ratio) may be *higher* than when the economic system operates near its rated capacity. We can easily see why productivity ratios might increase during periods of depression. Periods of depression can lead to the discharge of the least efficient employees and the shut-down of the least efficient plants and equipment first. Therefore, economy-wide productivity may be raised as the economy produces less and less. Common sense dictates that the productivity ratio must be supplemented by a measure of the *level* of economic activity. Actually this is not serious for this difficulty is a matter of interpretation. I only raise it to indicate the danger of an unthinking dependence upon a single measure of economic performance.

The second point I wish to stress so that historical productivity comparisons will not be overrated is, perhaps, a slightly more subtle one. Let us assume an economic community that

historically has always operated at full employment and, furthermore, has become steadily more productive through time. Has that community's economic welfare increased? Perhaps many would conclude that economic welfare *had* increased, but some economists would defer judgment. Surely this is a gross example of economists' notorious inability to arrive at definite conclusions. Or is it? Let us reflect a moment.

If real wages demonstrated a historical tendency to increase at a much faster rate than productivity, we would infer that the share of real output distributed as wage-payments was increasing secularly and that the share of output distributed to capital (and other factors of production) was decreasing. Correspondingly, if real wages did not increase apace with productivity gains, we would infer that a redistribution of real product away from wage-earners was taking place. For the sake of brevity let us refer to these possible changes as redistributive effects.

If we accept productivity increases as the sole measure of economic welfare, we have ignored the redistributive effects. There is a dilemma at this point. Take two collections of goods and services—one produced in 1958 and another *larger* collection produced in 1960. It is almost certain that the larger 1960 output will be differently distributed. It follows that although average incomes are higher, every individual income will not be. A rise in an average is thoroughly consistent with a fall in many of its components. When we speak of economic welfare we speak of two interrelated issues: one, is objective—the physical volume of production; the other, is subjective—the *distribution* of the physical volume of production. Economists are reluctant to make value judgments and hence many economists would hesitate to select a single distribution pat-

tern of product (or income) as the right one. For notice, that when a certain distribution is adjudged desirable something is implied as to the comparability of the satisfactions different individuals experience. Certain areas of economic theory deal rather exhaustively with this problem. I would only observe here that the safest course is to accept productivity increases as evidence of *potential* increases in economic welfare; and that men of good will may differ as to whether the potential is realized—as a consequence of their different non-economic criteria as to how productivity gains *should* be shared.

I should now like to take a brief look at the historical wage-productivity experience of the American economy. I will not belabor the obvious or smother you in statistics, but in this country economic growth has been so phenomenal as to deserve some reference to its magnitude.

The most comprehensive measure of economy-wide performance for which reasonably accurate historical data are available is the series for gross national product. Gross national product is a measure of total annual output of goods and services. Where one's interest lies in long-period changes in physical quantities it is essential to eliminate the effects of changes in the price level. When the gross national product series has been converted to constant dollars by an appropriate price index, it serves as an indicator of changes in physical output. In terms of decade averages, gross national product stood at \$29.4 billion per year for the period 1891-1900, and \$149.3 for 1941-1950 (both in terms of 1939 prices). Consequently, the volume of production increased approximately five times over the five decades from 1891. This five-fold increase amounted to an annual compound rate of growth in excess of 3 per cent.

During the same five decades, population almost exactly

doubled. It follows that the volume of production per capita increased two and one-half times in fifty years. One factor operates to *understate* even this phenomenal advance. These comparisons can take no direct account of changes in the *quality* of commodities and services going to make up the national product. For example, a 1915 and a 1955 automobile would be weighted according to their constant dollar price. When we reflect upon the changes in quality which have occurred, the record of growth is even more striking.

When wage and productivity series are corrected for price change by working in terms of 1939 dollars, we find that real wages, which stood at \$.31 per hour in 1914, had risen to \$.86 per hour by 1950. On the other hand, real product per man hour amounted to \$.56 in 1914 and had increased to \$1.18 by 1950. When the yearly observations for real wages and productivity are compared, we find close similarity in their movements over the 1914-1950 period. I do not suggest that every yearly variation in one series is matched by a corresponding variation in the other series. The short-run correspondence in the series is not impressive. But over the entire period, real wages and productivity moved upwards together.

Aside from the sheer magnitude of our economic growth, the parallel rise in real wages and productivity is of interest. We would say in statistical terms that the two series display a high degree of correlation and, indeed, when we compute a coefficient of correlation we find it to be large. When two series such as wages and productivity *do* move together over long periods of time, we are tempted to examine the circumstances closely in the hope that theory can afford us a convincing explanation—or a tentative law of behavior. But it is well known that high coefficients of correlation can mislead



the investigator. Economics and the other social sciences can present innumerable examples where two time series have displayed an extremely high degree of correspondence without there being the slightest logical connection between the two series. So as we turn to the economists' theoretical explanations of wage-productivity behavior we must carry with us some doubt as to the support that correlation analysis can give the theorist.

#### THEORETICAL EXPLANATIONS OF WAGE- PRODUCTIVITY BEHAVIOR

The traditional theoretical explanation of wage-productivity behavior was developed by economists of the late 19th century. The theory of marginal productivity, as it was called, received its fullest exposition in this country at the hands of John Bates Clark. Basically the theory involved the application of the differential calculus to the economic problem. Of course the calculus had been developed a few centuries previously but economists are slow to learn new tricks. They did learn this trick rather well and the theory of marginal productivity was gradually developed into an imposing theoretical edifice.

One feature of the marginal productivity theory to which I wish to direct attention was its assertion that the annual physical output of an economy was distributed in a definite, predictable fashion among the cooperating factors of production: land, labor, and capital. Where the assumptions of the theory are satisfied we should expect that real wages, for example, would be measured by the increment to total product accounted for by marginal units of labor. I am less interested now in the application of the calculus than in a feature of the marginal productivity theory which I believe

was implicit rather than explicit in the analysis. It was later assumed by many people that a *causal* relationship existed between productivity and wages and ran *from* productivity to wages. This may correspond fairly well with common sense although there is, I suppose, some doubt as to whether increased productivity is a necessary condition for higher wages in some cases—coal mining and the building trades come to mind.

However, we do not test theories against intuition or isolated aspects of experience—or should not. What about the high degree of correlation between wages and productivity that was mentioned earlier? Is not this the empirical support for the proposition that causation runs from productivity to wages? No, I am afraid that it is not. Statistical procedures are innocent of causation although statisticians are sometimes not. The parallel growth in wages and productivity is consistent with productivity-wage causation but it does not “prove” it by any stretch of the imagination.

Although economists may have typically inclined toward a view that productivity increases pull wages up with them, this interpretation is not the only one possible. In fact, if one were a true sceptic he might wish to place himself on the other side of the fence from many practicing economists. One of my colleagues has, in fact, given signs of being such a sceptic by pressing an investigation into the possibility that the marginal productivity theorists had it the wrong way around and that actually lines of causation (under certain circumstances) may run from wages to productivity. This is an interesting hypothesis which we might term “reverse causation.”

Offhand, one might object that reverse causation is unlikely on the ground that increased wages cannot come out

of increased production which has not yet occurred. But I do not know that such a judgment would be decisive. It is within the realm of possibility that higher wage payments could lead to increased research and development activity resulting, perhaps, in an enhanced ability to produce. In such a case, wages would lead productivity and exert some causative influence. There are rather obvious limits to such a process. Wages could be (and perhaps sometimes are) raised so high as to squeeze profits not a little but unmercifully. Still, the older accent on a rigid line of causation running from productivity to wages was unfortunate and like all simple cause-and-effect relationships is to be regarded with suspicion. Lest my remarks here be interpreted as a plea for higher and higher wages regardless of productivity developments, let me add that I would also regard a simple line of causation from wages to productivity with a considerable degree of suspicion.

I have alluded to two possible explanations for long-run wage-productivity behavior. One, derived from the marginal productivity analysis, calls for productivity leading wages. The other, reverse causation, calls for wages leading productivity. The statistical evidence does not help us here. There is no consistent lead or lag between wages and productivity. Instead, the short-run behavior of the two series seems to be irregular, with first one then the other series showing the way. It is my own feeling-based, perhaps, as much on intuition as on firm evidence—that no unvarying causal relationship exists between wages and productivity. I would propose the following explanation for wage-productivity behavior. In certain instances either wage changes or productivity changes may lead, but actually wages and productivity are mutually determining and perhaps mutually determined. By

“mutually determining” I mean to suggest that productivity and wages are linked through time with each one influencing the other and, in turn, influenced by it. By “mutually determined,” I only wish to emphasize the obvious—that wages and productivity are but two economic variables in a complex of many economic (and non-economic) variables. It follows that we must be alert to the possibility that the parallel growth of wages and productivity is, in fact, to be traced to some common influencing factor or factors.

This explanation of wage-productivity behavior is, I feel, closer to the facts of experience but perhaps less satisfying in that it leaves us with no simple, invariant explanation in terms of cause and effect. One role of economic theory is to narrow the possible range of alternatives which may occur. But there can be no justification for inflicting a theory on economic events which narrows the range of alternatives unduly. I simply do not believe that a simple, causal explanation of fluctuations in wages and productivity will do, and if this is true we are forced to the judgment that past theories of wage-productivity behavior have, in some respects, been defective.

#### RECENT WAGE-PRODUCTIVITY DEVELOPMENTS

I should like now to turn to a discussion of some recent developments in the collective bargaining process with reference to the positions of the interested parties (labor and management) on the relationship of wages and productivity. The discussion will necessarily be selective and, in the interests of brevity, I will limit myself to two of the many aspects of this problem. First, I should like to comment upon the occasional recourse to productivity as a formula for wage-fixing. Second, I shall point to what seems to me to be a

rather fundamental change in the attitude of organized labor toward the wage-productivity question.

The use of productivity as a formula for wage-setting has never been widespread (except for piece-rate plans); but some increased interest in the possibility of productivity formulas has been evidenced since World War II. Superficially, it might seem that productivity data could be very useful in this regard. After all, productivity (if measured correctly) should be an objective guide. Where the ability to turn out physical product in an hour, or a day, or a week has increased, should not the wage increase? Perhaps so, but available productivity data are almost invariably defective for the purpose to which they are so often put, namely, measuring the increased contribution of labor *per se*.

Productivity comparisons can be made in the following fashion. An index of physical output is divided by an index of labor-time input. Therefore productivity is physical productivity per unit of labor time. A simple example may serve to demonstrate that this measure of productivity has serious shortcomings. Suppose that for a certain firm we compare this year's output with last. Suppose further that physical output has doubled while labor works the same number of hours. Then productivity has doubled. But notice—and this is crucial—we do not know (without detailed examination) what caused the productivity gain. It is possible, of course, that labor, working with the same tools and equipment, really has worked just twice as hard—really has expended twice as much physical effort. But suppose that instead of increased labor effort, the company had borrowed money and installed new machinery and equipment. Could we assert then that labor, as a factor of production, was entitled to *all* of the productivity gain? I should think not.

The point which I wish to emphasize is that productivity gains typically result from cooperative effort on the part of many factors of production. There is, then, a *joint* claim to productivity gains. True, productivity is measured in terms of labor-time inputs but this is a statistical convenience and should never imply that the only source of productivity is labor. In practice the contribution of labor and management (for example) is so inextricably merged that detailed calculation of the separate contributions of each is well-nigh impossible. It follows that any formula approach to wage determination using productivity data must be a compromise. No matter how intricate the calculations, we may rest assured that the decision to tie wages to productivity is the result of a bargain rather than the result of any immutable laws of production. Of course a bargain is a bargain and if the interested parties wish to seal their bargain with a formula that is their concern.

Perhaps the best known of the formula approaches to wage determination is that embodied in the agreement between General Motors and the United Automobile Workers. There the agreement is complicated by the fact that wages are also tied to the Bureau of Labor Statistics Index of Consumer Prices, with contractual provisions for wage adjustments either up or down. But an integral part of the General Motors agreement is the provision for periodic wage increases to adjust for enhanced productivity. Unless one is a firm believer in a one-way chain of causation running from productivity to wages, it should be observed that the productivity increment to wages can be viewed either as a reward for past effort or as a pre-paid reward for future effort. Where the contract runs for a period of years, it is idle to speculate as to which is cause and which is effect.

The General Motors formula has not established a pattern for American industry, although it surely has established a precedent. There are rather good reasons why the use of a productivity formula in wage determination is not likely to become widespread. First of all, the measurement of productivity is virtually impossible for the service industries which comprise so much of modern economic activity. Second, relating wages to productivity is only feasible where the individual firm or industry position is well established and short-run variations in profits can be tolerated. Third, for productivity to serve as a wage-criterion, both management and labor must feel that such wage-bargaining is in their own interests. These situations are not common.

I do not mean to suggest that no recourse will be made to productivity comparisons in future negotiations. Surely it will. But I should like to counter the notion that productivity data furnish reliable criteria for wage determination in broad areas of the economy. Throughout much of the past decade—and particularly in the immediate post-World War II years—many commentators suggested (properly) that excessive wage demands in an inflationary setting can, under certain conditions, lead to a wage-price spiral. But some commentators went further and contended (improperly) that an operational guide to national wage policy is available from statistics of productivity. The suggestion was that yearly increments to real wages should be limited to yearly increments in nation-wide productivity. The suggestion is well-meaning enough but thoroughly impractical as an objective guide in given situations. National productivity gains are gross averages. In some industries productivity may decline—in other industries productivity may increase. The dispersion around the national average is very substantial. Average

national productivity is of interest to the economic historian but its relevance for those who bargain over wages in sub-sectors of the economy is practically non-existent.

It seems beyond dispute that for some time to come, collective bargaining over wages will continue without the aid of any magic formula relating productivity and wages. This is for the best. For despite the contentions of some theoretical economists, wage determination is not a price-making process such as may be observed in well-organized commodity markets. Bargaining over wages is but one aspect of an area of interest (and conflict) between institutional groups. The resolution of problems which arise in these settings is rarely aided by reference to formulas or capable of being stated in quantitative terms.

I should like to refer now to what seems to me to be a rather basic change in the attitude of organized labor toward the wage-productivity issue. In the past, labor has laid claim to some portion of productivity gains either on the basis of self-evident interest or upon grounds of distributive equity or justice. A somewhat different argument has been advanced by labor spokesmen within the past decade or so.

Drawing upon the experience of the 1930's, organized labor has pressed a new argument for wage increases in the face of productivity gains. The essence of the new labor argument is that where wage increases do not keep pace with productivity gains, an insufficiency of consumer purchasing power may bring about periods of depression and unemployment.

In order to evaluate this argument it is necessary to inquire into the relationship between wages, purchasing power, and employment. Prior to the 1930's it was generally accepted that wage reductions would normally increase em-



ployment in a depression setting. The reasoning was simple enough—perhaps too simple. Wages were regarded as a cost of production to individual employers. A general wage reduction through its cost-lowering impact would encourage employers to hire more labor, thereby reducing unemployment. Now this line of reasoning does seem proper in the case of an *individual* business firm; but notice that the answer to the question as to the effect of an economy-wide wage reduction is to be sought in the actions of *all* firms. Where wages are reduced by all firms, economy-wide purchasing power falls as wages are reduced and we can by no means be sure that employers will find their products marketable at a profit.

In other words, an *economy-wide* reduction will have two effects. One—the cost effect—works in the direction of increasing employment. The other—the purchasing power effect—works in the direction of reducing employment. Since *a priori* we know only the directions of change (which are opposite) we cannot conclude with certainty what will be the net effect of wage reduction on employment and production.

While it may be said that recent labor positions emphasize the purchasing power aspect of wage increases, the labor argument contains one ingredient which we have not mentioned explicitly. Judging from labor proposals at the time of the 1949 recession, we may state their position in the following terms. When a slackening in economic activity appears imminent, wage increases involve a transfer of purchasing power from profit-recipients. This transfer, labor spokesmen allege, will sustain the flow of total spending since at the onset of a recession, with business expectations shaken, retained corporate earnings are not so likely to be returned to the income stream through expansions in plant

and equipment. This argument would seem to regard wage increases as a form of medicine for employers—nasty to taste but capable of restoring health.

If one were to select a single criticism of the labor argument it would be that the position unduly neglects the cost and allocative aspects of the wage and concentrates upon the purchasing power aspect. My own feeling would be that the maintenance of satisfactory levels of national output and employment requires rather complicated monetary and fiscal measures. More is involved in the problem than pumping purchasing power into the economy through the debatable medium of wage increases.

The following summary conclusions may be drawn:

1. Despite a close statistical relationship between long-run movements in real wages and productivity, there is no all-conclusive case that either productivity or wages exerts a causal influence.

2. Productivity gains vary widely in sub-sectors of the economy, and a national average of productivity is a gross average concealing widely divergent movements in its components.

3. Productivity statistics are primarily useful as measures of over-all economic growth or performance. However, the wage-productivity relationship is sufficiently complex that there is little serious prospect of the widespread application of a productivity formula as a wage criterion.

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