A THEORETICAL STUDY ON THE RELATIONSHIP BETWEEN WAGES AND LABOR PRODUCTIVITY IN INDUSTRIES

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Abstract
In this paper, we examine the two way link between wages and labour productivity. In one way increase in productivity facilitates increase in wage, on the other way increase in wage induces increase in productivity. We have taken the help of ‘Theory of marginal productivity distribution’ to support the hypothesis i.e. productivity determines wages. Simultaneously, the classical view and Keynesian view indicate that wages determine productivity. Though the classical approach gives stress on wage cut policy to improve productivity but Keynes approach is different and that gives emphasis on that there is an inverse relationship between money wages and real wages. When money wages are reduced real wages rise. This is because a fall in money wages will lead to a more than proportionate fall in prices. When prices fall, real wages rise because of increase in value of money. Besides the above factors, some other model which support wage-productivity relationship like The Solow Model, Fair Wages, Nutritional Efficiency, The Gift Exchange Model, The Adverse Selection Model, The Shirking Model are also discussed in this paper. Finally, this paper is only a theoretical review on the relationship between wages and Labor Productivity in Industries.

Keywords: Labour productivity, Marginal productivity of labour, wage-cut policy, Keynesian Economics.

1. Introduction:
There is always a great focus on Labour productivity for the development of any economy by the Planners and policy makers. Productivity is a measure of the ability to create goods and services from a given amount of labour, capital, materials, land, knowledge, time, or any combination of these. It is measured, basically, as output per unit of input, where the input could be land, labour, capital, etc.

In any National Income Accounting, to improve the Gross Domestic Product (GDP) or the Gross National Product (GNP), it is more important to enhance the productivity and efficiency of the factors of production rather than the investment and public expenditure. Among all the factors of production, human capital (i.e. labour) is one of the most important factor that imposes effects on productivity (labour productivity).In this regard, the efficiency wage hypothesis ensures a relationship between wages and productivity. As per this hypothesis, wage rate acts as a motivating factor for the improvement of the worker’s productivity. The rise in productivity acts as deciding factor for the adoption of improved technology as a result of which there is an increase of the workers’ marginal productivity and skill and it moves towards the increase of the wage rate.

However, an employer(producer) always wants to maximize its profit with the increase in productivity (especially labour productivity) but in contrary the employee (labour) always tries to maximize its satisfaction level (i.e. improved cost of living and better financial background) through the increase of wage rate. Despite a number of controversies to which the marginal productivity theory has been subjected, most of economic thinkers are more or less agreed upon the idea that wages and productivity should be positively
related. So in this article, an honest attempt has been made to know whether difference in productivity is reflected by the difference in wages or wages determine the productivity.

2. Review of Literature
Ahmad Afrooz and Khalid B Abdul Rahim[1] in a study of ‘A Review of Effects of Gender, Age, and Education on Wage and Productivity’ observed that there is a positive relation between productivity and real wages. Similarly, the wage premium is found to increase with the years of schooling, and higher education was shown to yield higher productivity.

Lentz and Mortensen [10] argued that productivity differences between firms are closely linked to wage dispersion, and the association between measured labor productivity and individual wages is by now also well documented.

Gupta [7] in his study of labour incentive in Indian Iron and Steel Industry found that monetary incentives are best motivators which lead to better motivation and a higher labour productivity.

Matthew [9] stated, direct monetary benefits coupled with greater responsibility and autonomy in decision making were good motivators than other perks. However, the nonmonetary incentives are perhaps more important in the case of executives, particularly those in higher position.

Sharma [12] referring to the report of the National Commission of Labour, “under Indian conditions incentives were concerned with effective utilization of manpower which is quickest, cheapest and surest means of increasing productivity and stimulate human efforts to provide positive motivation to greater output.”

3. Theoretical Discussion

(I) PRODUCTIVITY DETERMINES WAGES

3.1 Marginal productivity of labour:

We now turn to the question as to what determines the prices of factors of production. A theory which tries to answer this question and widely accepted by professional economists is known as *theory of marginal productivity distribution*. It is generally defined as the change in output associated with a change in that factor, holding other inputs into production constant. The marginal product of labor is then the change in output \(Y\) per unit change in labor \(L\). In discrete terms the marginal product of labour (MPL) is,

\[
\frac{\Delta Y}{\Delta L}
\]

In continuous terms the MPL is the first derivative of the production function:

\[
\frac{\partial Y}{\partial L}
\]

So, graphically the MPL is the slope of the production function.
Every rational employer or producer always tries to utilize his existing amount of capital so as to maximize his profits. For this he will hire as much labour (units) as can be profitably put to work with the given amount of capital. For an individual firm or industry, marginal productivity of labour will decline as more and more workers are added to the fixed quantity of capital. He will go on hiring more and more labour units as long as the addition made to the total product by a marginal labour unit is greater than the wage rate he has to pay to it. The employer will reach equilibrium position when the wage rate is just equal to the marginal product of labour. It can be followed from the graph given below.

| Table- 1 |
| Marginal Product of Labour |
| Labour (number of employees) | Output (in numbers) | Marginal product of labour |
| 0 | 0 | 0 |
| 1 | 6 | 6 |
| 2 | 11 | 5 |
| 3 | 14 | 3 |
| 4 | 21 | 7 |
| 5 | 22 | 1 |
| 6 | 24 | 2 |
| 7 | 28 | 3 |
| 8 | 27 | -1 |
| 9 | 28 | 1 |
| 10 | 26 | -2 |

Figure- 1
3.2 MP\(_L\) and MC

The marginal product of labor is directly related to costs of production. Cost is divided between fixed and variable costs. Fixed costs are costs that relate to the fixed input, capital, or rK where r is the rate of return and K is the quantity of capital. Variable costs are the costs of the variable input, labor, or wL where w is the wage rate and L is the amount of labor employed. Thus VC = wL. MC is the change in total cost per unit change in output or \(\Delta C/\Delta Q\). In the short run, production can be varied only by changing the variable input. Thus only variable costs change as output increases \(\Delta C = \Delta VC = \Delta wL\). Marginal costs is \(\Delta wL/\Delta Q\). Now, \(\Delta L/\Delta Q\) is the reciprocal of the marginal product of labor \((\Delta Q/\Delta L)\). Therefore, marginal cost is simply the wage rate w divided by the marginal product of labor

\[
MC = \frac{\Delta VC}{\Delta q};
\]

\[
\Delta VC = w\Delta L;
\]

\[
\Delta L/\Delta q \text{ the change in quantity of labor to affect a one unit change in output} = 1/\text{MPL}.
\]

Therefore MC = \(w/\text{MP}_L\)

Thus if the marginal product of labor is rising then marginal costs will be falling and if the marginal product of labor is falling marginal costs will be rising (assuming a constant wage rate).

3.3 The Law of Diminishing Marginal Returns

The falling MP\(_L\) is due to the law of diminishing marginal returns. The law states, “as units of one input are added (with all other inputs held constant) a point will be reached where the resulting additions to output will begin to decrease; that is marginal product will decline.” The law of diminishing marginal returns applies regardless of whether the production function exhibits increasing, decreasing or constant returns to scale. The key factor is that the variable input is being changed while all other factors of production are being held constant. Under such circumstances diminishing marginal returns are inevitable at some level of production.

Diminishing marginal returns differs from diminishing returns. Diminishing marginal returns means that the marginal product of the variable input is falling. Diminishing returns occur when the marginal product of the variable input is negative. That is when a unit increase in the variable input causes total product to fall. At the point that diminishing returns begin the MP\(_L\) is zero.

3.4 MP\(_L\), MRP\(_L\) and Profit Maximization

The general rule is that firm maximizes profit by producing that quantity of output where marginal revenue equals marginal costs. The profit maximization issue can also be approached from the input side. That is, what is the profit maximizing usage of the variable input? To maximize profits the firm should increase usage "up to the point where the input’s marginal revenue product equals its marginal costs". So mathematically the profit maximizing rule is \(\text{MRP}_L = \text{MC}_L\). The marginal profit per unit of labor equals the marginal revenue product of labor minus the marginal cost of labor or \(\text{M} = \text{MRP}_L - \text{MC}_L\). A firm maximizes profits where \(\text{M} = 0\).

The marginal revenue product is the change in total revenue per unit change in the variable input assumes labor. That is \(\text{MRP}_L = \Delta TR/\Delta L\). MRP\(_L\) is the product of marginal revenue and the marginal product of labor or \(\text{MRP}_L = \text{MR} \times \text{MP}_L\).
Derivation:

\[ \text{MR} = \frac{\Delta TR}{\Delta Q} \]
\[ \text{MPL} = \frac{\Delta Q}{\Delta L} \]
\[ \text{MRPL} = \text{MR} \times \text{MPL} = \left( \frac{\Delta TR}{\Delta Q} \right) \times \left( \frac{\Delta Q}{\Delta L} \right) = \frac{\Delta TR}{\Delta L} \]

So from the above discussion, it is followed that here productivity determines wages of the labour.

(II) \textit{WAGES DETERMINE PRODUCTIVITY.}

3.5 The Classical view and The Keynesian view.

The classical economist believed that there is always full employment in the economy. So, in a competitive economy when money wages are reduced, they lead to reduction in cost of production and consequently to the lower prices of product. When prices fall, demand for products will increase and sales will be pushed up. Increased sales will necessitate the employment of more labour and ultimately full employment will be attained.

But Keynes did not accept the classical views and he started his views about the relationship between wages and employment by accepting the classical postulates that both the Law of Diminishing Returns and the Theory of Marginal Productivity operated. According to Keynes, unemployment resulted from the lack of aggregate demand. It is demand that determines employment, and employment determines the real wage rate. In order to establish this, Keynes pointed out that there is an inverse relationship between money wages and real wages. When money wages are reduced real wages rise. This is because a fall in money wages will lead to a more than proportionate fall in prices. When prices fall, real wages rise because of increase in value of money. But finally, Keynes denied that a cut in money wages would tend to produce a proportional decline in total outlay, demand, and prices, leaving real wages rates unaffected by the cut in money wage. Keynes also argued that workers are prepared to work at the current money wage rate, even if their real wage rates are lowered by increase in prices. This is because of the existence of “money illusion”.

3.6 Various theoretical models which support wage -productivity relationship.

The Solow Model: The simplest and the original efficiency wage model on which all later models build was developed by Robert Solow. Assuming that effort enters the production function, the firm will maximize profits by choosing that wage, where the elasticity of effort with respect to the wage equals to 1 (Romer) [11].

Fair Wages: This model was developed by Akerlof and Yellen [3]. Workers have some fair-reference wage, and firms have an incentive to pay wages that are closer to worker’s fair reference wage. Firms which pay less than the fair wage create dissatisfaction, low morale, high quit rates, shirking and absenteeism on the job, as therefore receive less productivity from their workers.

Nutritional Efficiency: An early idea due to Leibenstein [8] is that the equilibrium wage is so low that workers cannot feed himself and his family properly. In this case he will not have enough energy to work well. Giving him a higher wage will allow him to feed himself and will increase his output at work.

The Gift Exchange Model: Partial gift exchange hypothesis by Akerlof [2] is efficiency wage theory based on
sociological factors. He interprets when firms pay higher wages in excess of the competitive wage; the workers feel obliged and reciprocate with repaying in the form of the gift of higher effort level. According to the basic idea of the “labor market as partial gift exchange”, the loyalty of workers is exchanged for high wages, and this loyalty results in high productivity of the firm.

The Adverse Selection Model: This model, due to Weiss [14], assumes that better workers have better alternative offers. Firms set higher wages to attract a large “hiring pool” of the applicants who are heterogeneous in their ability to work and, in this way, they select the best workers from large pool. Firms have an incentive to pay higher wages if there is positive correlation between the average quality of the worker and wage rate.

The Shirking Model: This version of Efficiency Wage Theory has been developed by Shapiro and Stiglitz [13], Bowles [4], Fehr [6] and others. The problem confronting the employers is to minimize shirking because employees shirk on their jobs whenever they find opportunity. Monitoring is imperfect and costly for the firms so the payment of wages to the workers in excess of the current competitive market wage is an effective way to discourage shirking.

3.7 Problems with assessing productivity-linked wages

There are several ways of linking productivity with wages. It could be done on the basis of introduction in the whole industry, or in one sector. The problem is that labour productivity varies from industry to industry, thus a blanket method of assessment is not feasible and allowing separate methods may lead to disparities. Such differentiation will lead to agitations in organizations and industries will not be able to give their best.

Further, in industries where the output is the result of teamwork, how can the contribution of each worker be assessed? How can there be a proportionate increase in wages for the workers? The workers have to be convinced that there is no partiality in the increase of wages for different workers. These problems with assessing productivity-linked wages have not been solved yet.

Conclusion

Productivity-linked wages are based on the output produced by a worker. The concept of productivity-linked existed in a rudimentary way, however with the coming of globalization there is a growing competition at the international level and thus to maintain a position in this global world there was a need to increase efficiency at work and to produce more with less costs and time. Due to this productivity-linked wages has become an important choice for enterprises. Linking productivity and wages has a positive effect on the economy. It provides an incentive for the workers to increase the output. An increase in productivity leads to a greater supply in the market. This would result in lower prices. Hence, it would affect the consumers beneficially as well. Increase in productivity would lead to increase in exports. This would also be beneficial to the economy. Where wages are linked to qualitative productivity, the quality of production would also be high. There is however, a risk of the quality of production being low where wages are merely linked to the quantity produced, thus a solution to this would perhaps be a standard of quality which can be laid down in the organization.
References


