Chapter 1

Introduction

It is now-a-days a commonly accepted fact that the public enterprises in India are suffering from acute inefficiency. Two types of inefficiencies characterise these enterprises —— price inefficiency and technical inefficiency — which together constitute X-inefficiency*. This X-inefficiency reflects itself in low productivity, low profitability, and under-utilization of capacity. It is in this context that application of incentive schemes in public enterprises assumed special significance.

The theoretical part of the literature on incentives runs along two distinct lines — one emphasizing the 'ability to work' aspect and the other highlighting the 'will to work' aspect of worker-participation. The former is called the 'Efficiency Wage Hypothesis' (Sau (1988), Basu (1984), Bowles (1985), Stiglitz (1976), Mirrlees (1975), etc.), and the latter in known as the 'Problem of Incentive Contracts' or 'Principal Agent Problem' (Lazear (1981, '86), Fan (1975), Fama (1980), Calvo and Wellisz (1978), Ross (1973), etc.). The present work tries to make a synthesis of the two strands of literature by bringing them together under the more general study of 'Incentive Schemes'. In order to make our theoretical structure more realistic, we draw heavily from the findings and conclusions of some important


Incentive scheme is a device whereby all those who are engaged in production are motivated to use their productive efficiency as effectively as possible, without use of too much supervision and exhortation. Its importance depends upon the extent to which ownership is divorced from management. A small owner-managed firm does not require an incentive scheme in the same way as a large firm, where management is not in the hands of the owners. As a matter of fact, the importance of an incentive scheme arises from the Principal Agent problem, where the principal wants its agents to act in such a way as to serve its (the principal's) objective in the most desired manner. This Principal-Agent problem becomes all the more complicated in the case of public enterprises, where ownership is much more divorced from management than in case of a joint stock private company — the parliament being an intermediary between the owners (the people) and the management.

The distinctive characteristics of public enterprises vis-a-vis private enterprises makes relevant the study of incentive schemes oriented specifically to public enterprises. But the existing literature is deficient in this regard. Unlike private enterprises, which more or less follow the single objective of profit maximization, public enterprises pursue diverse
objectives, leading to the adoption of different pricing policies like marginal cost pricing, average cost pricing, mark-up pricing, landed cost pricing, and sometimes even profit-maximization pricing. This lack of uniformity may be one of the reasons why the existing literature avoids taking up public enterprises for an analysis of incentive schemes. However, it can be shown that all these diverse objectives of public enterprises often reduce to a single objective with very little departure from reality. It is the objective of maximization of social welfare (i.e., the sum of consumers' surplus and producers' surplus) subject to two constraints — a profit constraint and an employment constraint. In most of the cases (when the profit constraint is infinitely binding) this boils down to the objective of profit maximization subject to an employment constraint. Therefore, in our theoretical analysis, we accept this objective as being the condensed form of the host of objectives followed by different public enterprises.

By virtue of having command over the 'Commanding heights' of the economy, the public enterprises are the prime movers of economic development. The private sector is heavily dependent on the public enterprises for the supply of critical raw materials including some essential services. Moreover, a considerable part of the investment goods required by the private sector is produced in the public sector. Hence, any inefficiency of the public enterprises, leading to higher costs and prices, would escalate the costs and prices of the private sector as well —— thereby causing a cost-price spiral. Given that only around 55%
of capacity is utilized on the average by the public enterprises, there seems to be little justification for purchase of sophisticated machineries, requiring colossal expenditure, as a means for enhancing productivity. Possibilities of higher productivity by way of improving the internal organization of firms have to be explored. An incentive scheme is probably the only way to improve the internal organization of a firm.

Public sector is known to be a good employer. It is pointed out by some critics that an incentive scheme would reduce employment, since with higher productivity less labour would be required for producing the same output. This argument will be valid only when the demand for output is perfectly inelastic. But in reality the enterprises often face demand curves which are considerably elastic. In this situation a fall in unit cost consequent on increase in productivity would enable a firm to increase its sales by reducing price. Thus, an enterprise facing an elastic demand curve might require more labour than previously if productivity increases. Even if demand is inelastic, incentive schemes can be worthwhile in other ways as well. There is ample evidence in the industrial engineering literature that greater effort by the employees can considerably reduce material cost as well as overhead cost for any constant output level. Thus, even under inelastic demand situation an incentive scheme can enhance profits substantially — a part of which the workers can get as 'surplus-wage'. Another important
avenue for higher profits, which is often overlooked by economists, is the improvement in product-quality as a result of greater care shown by the workers in production. Of course, quality depends upon a host of other factors like quality of material used, the degree of sophistication of machinery and equipment, etc., but decidedly more important is the quality consciousness of the workers. If customer-service and after sales-service are also included within the broader definition of quality, the importance of workers' motivation in determining quality becomes all the more glaring.

We need an appropriate measure of productivity which incorporates all the above effects of incentives. We can accept either the Kendrick Index* or the Solow Index**, since both of them are 'total factor productivity indices' satisfactorily capturing the multiplicity of impacts of incentives on productivity. Of course, these have to be modified to accommodate the efficiency wage hypothesis. Kendrick's Index is the ratio of value added to the weighted sum of capital and Labour—the weights being the base period 'rental rate' and 'wage rate'


for capital and labour respectively. But since, under efficiency wage hypothesis, wage rate has a separate impact on productivity via motivation, it should not be kept constant at the base period level. Thus, the modified index becomes the ratio of value added to the sum of rental earning evaluated at base period rental rate and the total 'current' wage bill. There is another version of Kendrick's Index which adds the cost of materials both in the numerator and in the denominator, giving us the revised form as the ratio of total sales revenue to the cost of sales. Solow's Index, on the other hand, uses the growth rates of value added, labour, and capital to arrive at the growth rate of productivity contributed by technical progress. Here also, we can add the growth rate of wage-rate to account for a part of the change in productivity. It is interesting to note in this connection that under the assumption of competitive equilibrium, the Solow Index and the Kendrick Index are equivalent for small changes in output and inputs*. The question is whether the above indices adequately reflect the impact of incentives on quantity, quality, and cost of production. The fact that they do, is easy to understand.

In the incentive literature, production is considered as a function of efficiency-units of labour, i.e., hours of labour multiplied by an 'efficiency parameter'. It is this efficiency parameter which is affected by an incentive scheme. Bowles (1985)

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defines the efficiency parameter as the percentage of time on the job during which the worker actually works. According to Basu (1984), Stiglitz (1976), and others, efficiency parameter is the intensity of work per hour, rather than the proportion of an hour actually worked. Akerlof and Yellen (1990) define it as:

\[ e = \min \left( \frac{w}{w^*}, 1 \right) \]

where 'w' is the actual wage and \( w^* \) is the fair wage. These diversity of definitions notwithstanding, all the qualities of the workers constituting his efficiency can never be properly represented by an efficiency parameter. Efficiency of labour includes several characteristics of a worker, such as:

i) initiative and effort,

ii) sense of responsibility,

iii) aptitude for work,

iv) cooperation, honesty and integrity,

v) discipline,

vi) attendance and regularity,

vii) sincerity and loyalty, and

viii) skill, which includes sense of judgement, craftsmanship, speed, and some extraordinary personal characteristics.

The object of a good incentive scheme is to extract the right configuration of the above constituents of intensity of work. For example, if speed is more needed than craftsmanship, one type of incentive scheme design would be suitable. If, on the other hand, craftsmanship and care are more required than speed, another
type of incentive design would be more appropriate. It follows that the design of an incentive scheme is very important, and the type of the design an enterprise needs depends upon the special circumstances and environment faced by it. Since the design of an incentive scheme is inseparably associated with the interrelationship between its two constituents, the 'efficiency wage' and 'incentive contract', let us now discuss the interdependence between these two types of incentives.

Briefly stated, an unconditional increase in wage, contributing to higher productivity, is termed as 'efficiency wage', and a conditional wage increase, leading to greater productivity, is called 'incentive contract'. The problem lies in identifying the differential impacts of the two. If we associate efficiency-wage with ability to work, we can not expect any immediate impact of a wage increase on productivity, owing to the fact that it requires some time before the higher wage can enhance the ability to work of the worker. Nevertheless, it is often observed that an unconditional wage increase immediately increases the effort of the worker. This is a testimony to the fact that an unconditional pay rise may also arouse and enhance the 'will to work', (motivation). Further, in some cases the wage increase may be apparently unconditional, but there might be some implicit conditionality involved. For example, the workers may feel that if they do not spontaneously respond to the higher wage by giving more
effort, the management might reduce the wage in future. Even if there is no such fear, an initial wage increase might induce the workers to contribute more effort out of the expectation that enhanced effort might please the management and prompt it to increase the wage further in future periods. All these responses to an unconditional wage increase have nothing to do with ability to work.

A conditional wage increase, on the other hand, taps purely the 'will to work' of the worker to extract greater effort. The ability of work becomes relevant here only to the extent of putting a constraint on the will to work. A worker, having low ability to work, can not respond to lucrative incentive contracts very greatly. However, under normal circumstances, it is expected that a conditional wage increase, which works by way of enhancing the 'motivation' of workers, would have a greater impact on productivity than an unconditional wage increase.

Motivation acts as a bridge between incentive schemes on the one hand and productivity on the other. The possibility of leakage in the way from motivation to productivity makes the link between incentives and productivity weaker. Even though an incentive scheme can increase workers' motivation, the latter may fail to be reflected in higher productivity due to various reasons, like lack of demand, lack of material and power supply, poor condition of tools and instruments to work with, and so on.
However, these leakages can be considerably plugged by motivation itself. For example, a motivated team of workers can improve the quality of product which helps in increasing the demand. It can also economize on the use of power, fuel, material and other inputs, thereby easing the scarcity of materials, as well as reducing the unit-cost of production. Hence we can expect a significant positive impact of a good incentive scheme on productivity. Of course, the scheme must be able to orient the motivation of the workers to quality improvement, quantity increase, and cost reduction in a balanced way so that a given sum of incentive expenditure contributes to the greatest increase in efficiency of the firm. For example, in a situation of considerable excess demand, quantity orientation should receive the first priority; while in case of shortage of demand, quality and cost orientation must prevail over quantity orientation. The three types of incentives are complementary in the sense that one type of incentive enhances the need for the other types. For example, if cost oriented scheme reduces cost and allows a price reduction, the consequent increase in demand would strengthen the need for quantity oriented incentives. Further, if faster production adversely affects quality, quantity oriented schemes should be accompanied by quality-oriented ones. Again, if quality improvement requires additional costs to be incurred, cost oriented incentives would be required to keep down the cost of improving quality.
It follows that the interpretation of the term motivation is not so straightforward. Motivation is associated with the term 'motive', hence the connotation of motivation changes with change in the motive. Selecting the right type of motives is, therefore, of primary importance, since motivation would then be channelled in the desired directions consistent with the objective of the firm. If an incentive scheme can instill a sense of belonging among the workers, in which case the interest of the firms and of the workers become identified, a very good ground is prepared for motivation. In this case, we have a highly motivated team of workers — the motivation of them being of the general type. But this general type of motivation is not sufficient for improvement of efficiency of a firm; it needs to be supplemented by specific motivations as mentioned above.

Although motivation — by which term we mean the 'will to work' — is very important for production, it requires to be supported by 'ability to work' in order for the will to work to have the greatest impact on productivity. Hence a balance is also required between motivation and ability. Too much ability and too little motivation, or vice versa, is not conducive to satisfactory productivity. In fact, motivation and ability are not mutually exclusive. Factors which adversely affect motivation might reduce the ability to work as well. For example, lack of cooperation among workers whose works are interdependent, adversely affects both motivation and ability. Unsatisfactory working *See R.K. Misra — 'Incentives and Motivation' — in 'Wage Incentives, Theory and Practice' ed. by G.K. Suri (1973), published by Shri Ram Centre for Industrial Relations and Human Resources, New Delhi.
condition — which includes conditions of tools, instruments and machineries with which the worker works, the environment in which he works (temperature, light, humidity, sanitation, ventilation, etc.), the nature of job, behaviour of the supervisor, etc. — tells upon both 'ability' and 'will' to work. Further, if a skilled worker suspends work for want of proper motivation, he may forget his skill after some time due to lack of practice — which means his ability to work falls. Hence, measures for increasing motivation may favourably affect the ability as well. But this is not likely to be the situation always. Increased motivation may also cause a fall in ability. If a highly motivated worker exerts himself too much, his health may be impaired in the long run, thereby dampening his ability. Therefore, an incentive scheme should take care that the worker does not work too fast. A balanced package of incentives is the one which strikes a balance between motivation and ability.

Another aspect of incentive scheme design is the combination of 'payment by result' and 'payment for result'. Payment-by-result is a conditional type of incentive which is more effective in the short run than in the long run. On the other hand, payment-for-result is an unconditional type of incentive, which works more in the long run than in the short run. The former is the kind of payment which a worker gets if he increases his productivity by increasing his effort. Productivity linked bonus, profit sharing, piece-rate, time-rate, merit promotions,
honours and awards, etc., fall in this category. The latter is the sort of incentive which a worker receives in the form of better working condition, various types of social security and social welfare facilities, time to time increase in wages, with-pay leaves, on-the-job training, canteen facilities, etc. These are not conditional payments. The expenditures involved in these kinds of incentives are aimed at making the workers spontaneously motivated, as opposed to motivation by allurement. Hence, the impact on productivity of this latter type of incentives is likely to be steady and lasting. On the other hand, the impact of payment-by-result type of incentives on productivity is certain to be very speedy; there would be a prompt and sharp increase (or fall!) in productivity depending upon the methods of payment adopted within this category. Hence, if the exigencies of the situation requires a perceptible increase in productivity in a very short period, 'payment-by-result' would be the appropriate variety of incentives. Another feature of this category of incentives is that it does not require much resources. What is mainly needed is a 'trial and error' method, whereby the design of incentive scheme is gradually tuned to perfection. As a matter of fact, these two basic types of incentives are interdependent. It is only in the presence of a proper dose of payment-for-result that payment-by-result is likely to work very effectively, and vice versa. In fact, the interdependence between these two types of incentives emanates
from the interdependence between ability-to-work and will-to-work, in as much as 'payment-for-result' takes care primarily of the ability-to-work, and 'payment-by-result' primarily takes care of the will-to-work. Therefore, a well designed incentive scheme requires a proper mix of these two types of incentives, depending upon the financial strength of the firm and the urgency of an increase in efficiency.

Apart from the short run impact of incentives, there is also the long-run or dynamic impact which works through the lagged effects of efficiency wage. Since lagged impacts are independent of conditionalities, they represent the ability to work aspect of incentives in a greater way than the motivation aspect. The ability to work does not respond instantaneously to wage increase. It takes some time before the higher wage shows off in higher ability to work. Better food, clothing, education, recreation and other aspects of better life style slowly builds up a worker's physical and mental health which are conducive to greater work.