An Incentive Based Salary Of A Teacher*

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Abstract

We provide a simple structure to determine the performance-based salary of a teacher. Hence, we identify some factors that can be estimated objectively.

1 Introduction

In the recent years the university and college teachers have been literally cornered by the UGC and the Ministry of Human Resource Development. This has tarnished the image of the teachers. Moreover, teachers have been made scapegoat of the situation. Partially, teachers as a group are responsible for their misfortune. There has been an all round degradation of education in the country. But only the teachers are looked down. In this paper we like to analyse this issue. Although we are talking about 'university and college teachers', similar analysis can be extended to include other categories of teachers also.

Why are the teachers blamed? What is wrong with them? Before 70's teachers' salary was deplorably low both in absolute and relative sense. But, it is said, the poor income was overcompensated by the regards they would draw from the fellow people; otherwise, why would they opt for teaching? True, they were respected by every one for their devotion and honesty to the profession. Nowadays teachers are getting a fat salary, but, it is lamented, they are taking a minimum sense of social responsibility. They are accused for more than one reason. They are irregular to the office; they don't take their scheduled classes; they don't extend necessary cooperation to uplift the educational level; they are more keen in giving tuition and money making; sometimes they give tuition even in office hours; they are not serious to examine answer scripts; similar to these are many allegations labeled against the teachers. Perhaps the allegations are not all baseless; there are lot of grains in that. At least a sizable portion of teachers fall in that class. Nowadays students are seen to depend more on private tutors than on class lectures in the universities and colleges.

Particularly two allegations are often clubbed together — teachers do not take classes regularly, and teachers are more keen in giving tuition. Prima

facie, the question is: What is wrong in teachers giving tuition? If tuition is demanded, who will give tuition? Who else are the appropriate persons for giving tuition, if not teachers? Hence as such there is nothing wrong if teachers give tuition. But, of course, it must not be at the cost of their regular duties in the colleges and universities.

Here is a moral hazard problem.[1] Employers, the principal, cannot properly verify or monitor teachers' (agents') activities. So, as in many other professions, teachers have incentives to shirk and take advantage of the situation by not exerting full efforts in the office. After all efforts are costly. As every one knows, simply high salary will not work. If salary is fixed delinking with it the performance and productivity, then rational utility maximization implies that the performance and productivity will be low; and if there is any outside source of income, the employees will divert their energy and resources to earn additional incomes from the outside source. Then question is: Can we meaningfully construct pay structures for the teachers? If pay is not contingent on performance, the individuals are unlikely to devote sufficient attention and energy to their jobs. Hence an incentive-cum-punishment scheme may be thought of by relating teachers' salary with their performance which can be verifiable. At the same time the scheme should be simple and transparent. The salary structure as prevailing in India provides little incentive to do hard work, and for some reasons or other hardly there is any effective punishment threat. Hence the present system cannot cope with the problem. In most of the employment contracts wages are linked to the jobs rather than to individuals, that is, what any particular employee is paid is determined primarily by his or her job assignment rather than by actual productivity and opportunity costs.[2] The problem of attaching individuals

[1]On Moral hazard problems see Kreps (1992, Ch. 16) or any advanced book on microeconomics.

[2]For an overview of internal labor markets, job assignments and promotions, see Mil-

to performance is that the performance and productivity are very difficult to measure. In academics in particular, hours of work and efforts are not observable. Hence our task is to find out those characteristics which we can measure meaningfully. The purpose of the present article is to identify some factors that should be considered as important for determining the salary and performance of a teacher, and these factors are to be estimated objectively and defined unambiguously. To implement any such scheme a cooperation between the teachers' association and the education department is essential.

This is not all together a novel scheme. In fact, in most of the colleges and universities elsewhere and in some institutes in home and abroad, similar type of incentive based salary scheme is prevailing.[3] Whether education in India should be privatized is a debatable issue, but if it is privatized, an incentive based scheme is a necessary choice. This paper talks about an incentive based pay scale consistent with the Indian college and university education system. The nature of output produced by a teacher is quite different from

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grom and Roberts (1992, Ch. 11).

[3]In most of the colleges and universities outside India a system of academic tenure is prevailing. Accordingly, an academic department is looked as an internal labor market. The university administration wants to ensure that members of its departments are willing to hire the best possible candidates. Under the tenure system teachers who have met the tenure criteria, cannot be fired simply because their talents and performance levels have deteriorated or their particular area of expertise within the field is no longer in demand. Hence they have no reason to fear the hiring of people who are better qualified than they are and no reason to misrepresent the quality of candidates. (See Milgrom and Roberts (1992) for an analysis on this. Carmichael (1988) provides a model to show why academic tenure is necessary). In Indian universities and colleges, the system is bit different. The universities or some other bodies are responsible for giving an appointment to a teacher, and the appointment is like a long term contract, but the funding comes from the government exchequer. Possibly this is the reason why the appointing authority does not take proper care about the works and performance of the teachers, and the government puts arbitrary constraints.

the outputs produced by a worker in a factory place. Hence the incentive scheme is different although the spirit of the analysis is the same. Also in the scheme we are suggesting, teachers will not have to compete with other teachers. Hence they will not have to be involved in unnecessary rivalry and unfair competition.

In the paper we first identify a set of factors which are relevant for fixing up the basic pay of a teacher. Then we identify some variables which can be unambiguously estimated in the [0, 1] scale. The coefficients of these variables will act as incentives. The coefficients are in fact the weights or importance that are to be associated with those variables. How much weights or emphasis be placed on the incentives is a national choice. Also there are schemes for punishment. As we argue, under this scheme teachers will expose their teaching and research capability — incentives for not attending the office and not taking classes regularly will be checked; also the incentives for giving tuition will be reduced. If under this scheme any one even then finds giving tuition worthwhile, he or she deserves a lot of praise, and not blame.

It is not that we are suggesting a full-proof mechanism. No system is full-proof. So those who are just mad in the profession, in the sense that they wholly dedicate themselves to teaching and research without caring any rewards or monetary benefits, will be hurt in mind. Again there are some who will under this scheme undermine their performance by reacting against a sense of being controlled, thinking something like, "I will show the company that I can't be controlled just through money" (Pfeffer, 1998). The behaviour of these classes is difficult to analyse. Our analysis presumes that people take jobs and decide how much effort to expend in those jobs based on their expected financial (and non-financial) return. Hence we presume that the only way they can be induced to work is through some combination of rewards and sanctions.

In the next section we provide a model designing an incentive scheme

for the teachers linking salary and work. The third section briefs our views regarding promotion. The final section is a conclusion.

2 Model

The salary of teachers may be determined totally objectively, given the fact that the employer cannot perfectly monitor the actions of the teachers. Hence an incentive contract is called for. It is possible to identify some factors which, we mostly agree, should influence the salary (gross) of a teacher. We identify three sets of factors or variables which are disjoint. Some factors are meant to determine the basic pay of the teachers. Some factors are related to incentives for rendering higher effort, and the other factors, as we argue, will be connected to honor or punish the teacher as the case may be. First consider how we can fix up a basic pay for a teacher. We have identified four such factors as relevant.

Fixation of the Basic Pay

(B1) There is of course some desired minimum qualification for a particular position in the job. Say, for example, that a master degree on a subject with 55% marks in the aggregate is needed for the position of lecturer in a college. This level is determined from outside the purview of our analysis. Now suppose that with the appointment of a teacher (based on the fulfillment of the minimum qualification), a basic pay, B_0, is fixed per month, which depends on the social norm and standard. This takes care of both the absolute and relative importance of the job. If the society thinks that college teaching has no much value, B_0 will take a lower value. A committee appointed for this task will decide the size of B_0. When we are talking about any such committee, it is implied that teachers' representatives are included as members.

(B2) Then decide the rate of increment per year. The above mentioned

committee is entrusted to determine the value of a parameter, α_0, such that $\alpha_0 B_0$ be the amount of increment. For simplicity, let us keep α_0 constant for the whole scale of this category. With this the basic pay in the tth period $(t = 0, 1, 2, ...)$ is reached to

$$B_t = (1 + t\alpha_0)B_0. \tag{1}$$

Note that in our notation tth year means the year started after t years of service; the 0th year is the initial or beginning year of service, and so on.

(B3) If a person acquires some special degrees which are, in addition to the minimum degree he requires to fulfil, considered as teaching or research capability improving, the teacher concerned should be given additional increments (h). These degrees and the corresponding number of increments must be well-defined. For example, as we have, the M.Phil and Ph.D. degree holders are given respectively one and three additional increments. With this the basic pay of a teacher in the tth year will be

$$\tilde{B}_t = [1 + (t + h)\alpha_0]B_0.$$

(B4) Finally we propose that the basic pay should be adjusted for inflation. If τ be the rate of inflation per year,[4] then the adjusted basic pay in the tth year will be

$$A_t = (1 + \tau)^t \tilde{B}_t. \tag{2}$$

This completes the determination of the basic pay of a teacher in any year.

Now we search for those variables which will be related to incentives for doing the job more efficiently. In our scheme we do want to introduce discrepancy in gross salary between two teachers depending on the ability and efforts they are devoting. We have a number of factors to consider.

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[4]Although in equation (2), we have taken τ as same for all years, but it is not at all necessary, and the expression can be easily modified to take into account the possibility of variable rates of inflation.

The Determination of Gross Salary

In this category we have identified six factors as important. These are discussed below.

(S1) First consider the proportion of the total working days in a year a teacher was present in the office. Duty leave (like attending meeting, seminar, conference, etc.) is considered as 'present'. To facilitate the counting we assume that teachers sign on the attendance register, and give applications for any kind of leave they take, if any. Let r_1 be that proportion. Generally, leave is considered not a right; so in calculating r_1, whether other kinds of leave will be excluded or included may be a matter of convention to be agreed upon.

(S2) Next consider the proportion of classes a teacher has taken out of the scheduled or desired number of classes for that course. It is quite natural to presume that even if he takes leave for some time, or institutes are closed on days of class, he compensates the loss by taking extra classes. We denote the proportion by r_2.

(S3) Now assess his teaching capability and related effors. This should be reflected in the results (in the subjects he is teaching) of the board or university. Quite obviously, students always try to perform their best in the examination and get marks as much as possible. Sometimes there are some errors in the publication of the results. With certain degree of care and sense of responsibility this can be minimized substantially. So we ignore this aspect. Now consider the proportion of students passed in the examination on that subject as the relevant indicator of the teacher's teaching efforts and capability. Denote this by r_3. It is possible to break down this factor into sub factors, e.g., marks below 40%, from 40% to 60%, and above 60%, or like that. But we assume away this complication.

(S4) Then introduce students' evaluation of a teacher. It is the students who can really judge the capability and sincerity of a teacher; teachers are

meant for the students. We suggest a very simple kind of evaluation by a student.[5] Each student will be asked to choose one of the three alternatives about a teacher: (i) Excellent or very good, (ii) Good, (iii) Not good enough. The choice will be made as secret ballot paper so that students' identity remains undisclosed. Suppose, the numbers corresponding to these alternatives are agreed upon to be respectively 1, .6 and .4. Then take the average of the scores as assessed by the students as the relevant index, r_4.

(S5) Then consider evaluation by the nearest boss (say, principal/head of the institute). Such an evaluation will be based on the extent of help and cooperation extended by the teacher in question. For example, the following factors may be taken into consideration, viz., whether the person attends relevant meetings regularly, examines answer scripts in due time, takes some administrative responsibility at the time of students' admission, etc. This will be evaluated in [0, 1] scale. Denote the index by r_5. It should be reiterated that it is not a confidential report. Since evaluation is based on facts, so the reports must be made public at the end of the year.[6]

(S6) Then comes research activity which is part of the job. This includes presenting papers in the seminars and conferences, giving special (invited) academic talks, and publication of articles and books. Denote the index by r_6. Again it has to be reduced in the [0,1] scale. Suppose, publication of an article in the refereed journal brings $r_6 = 1$ or presenting papers in the national or international conference is awarded a score .5, etc. It is the task of the committee which will clearly specify the possible values that r_6 can take.

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[5]In fact, students' evaluation may be given much more importance than what is simply suggested in the text. For example, students may be asked to report whether the course objectives are clearly stated, achieved and well-presented by the respective teachers, whether the teacher is open and receptive to students' views and is accessable outside the class, etc., and finally, whether the student is satisfied with the teacher's performance.

[6]For that, weights attached to the different items must be announced earlier.

The above six variables (as defined in S1 through S6) are considered incentive variables[7] which will differentiate salaries between two teachers depending on their ability and efforts. Given these variables, $\{r_i\}_1^n$, let $\{\alpha_i\}_1^n$ be the associated coefficients (or multiplicative factors) denoting weights or importance assigned to the corresponding variables; $0 < \alpha_i < 1$, $\sum \alpha_i = 1$. These α_i's are to be decided by an expertised committee, and once these are fixed up, these become public knowledge. Thus $\alpha_i r_i < 1$, $(i = 1, 2, ...n)$, represents incentive associated with the ith factor. The α_is are same for all persons but r_is vary from one teacher to another.[8] Let us denote

$$\beta_t = \{\sum_i \alpha_i r_i\}_t,$$

that is, β is the weighted average of r_i's for the t-th period. Note that the value of β_t can be known only at the end of the t-th period. Now, given the basic pay, A_t, as defined in eqn (2), the ith incentive brings him an income $\alpha_i r_i A_t$. On the basis of this calculation, the per month gross salary of a

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[7]We are not claiming that we have provided just exhausted list of factors. But we think that these factors are primarily important. If any other factor comes up as important, in our structure we don't have any problem to accommodate. However it is necessary that the variable is defined in the [0, 1] scale.

[8]If we want to make distinction between the responsibilities of the college teachers and university teachers, we shall have to decide two sets of α_is $(i \neq 0)$, one set for college teachers and the other for the university teachers. For example, we can think that how many days in a year an university teacher be present in the office is a least important factor. In that case, for the university teachers, the corresponding weight, α_1, should be close to zero, and the loss is to be compensated by the higher weights attached to some other characteristics considered more important.

teacher in period t will be[9]

$$S_t = A_t[1 + \{\sum_{i}^{n} \alpha_i r_i\}_t].$$ (3)

Note that we have not restricted the value of β. So the committee has much flexibility to decide over the values of α_is.

There is one problem to be resolved. The way we have defined β_t, at $t = 0$ (i.e., the date at which the teacher is entering) β_t has no entry. So what will be the gross payment to a teacher at $t = 0$? The committee is entrusted with the task of determining a bare minimum value of β, say β^*, without attainment of which his continuation is, in fact, threatened in the future. Also for all the years the person fails to attain the level of β^*, his or her increment will remain pegged.[10] Hence his provisional salary in the initial year will be

$$S_0 = A_0[1 + \beta^*],$$ (4)

and he will have to be paid an arrear accumulated at a rate $(\beta_o - \beta^*)A_0$ per month with the salary of the first month of the next year if $\beta_0 > \beta^*$; otherwise zero arrear. In fact every year there will be some adjustment of the arrear, that is, his arrear per month in the tth year is $K_t = (\beta_t - \beta_{t-1})A_t$ for all $\beta_t > \beta^*$; otherwise, $K_t = (\beta^* - \beta_{t-1})A_t$. Hence under ¿this scheme his gross salary per month in the tth year becomes

$$S_t = A_t[1 + \beta_t] = A_t[1 + \beta_{t-1}] + K_t$$ (5)

where K_t is to be paid in future as arrear. In this scheme it is quite obviously possible that a person's gross salary in the present year falls below the gross

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[9]In practice the gross salary (per month) will also include other allowances like house rent allowances, medical allowances, city allowances, etc., each of which is proportional to the basic pay of the counting year. Since these components do not involve any incentive question, we exclude these items from our analysis.

[10]In some sense it is a 'fixed fee plus output-based royalty' scheme.

salary of the last year, although the basic salary is growing up as usual. Hence he will have an incentive to keep his salary growing, thereby keeping up his teaching and research ability.

In our structure this β^* parameter is very important, because it has some other important roles to play. Note that this parameter was set at its bare minimum level. So after assuming the job if a teacher fails to achieve that critical level (i.e., if $\beta < \beta^*$) for consecutive three years, his or her service will be in question and he will be asked to show cause, and if the answer is not satisfactory, as reviewed by a special committee (to be set up for this purpose), he may be driven out of the job. This will certainly be a threat to those persons who devote lot of time in other practices, such as politics. No one can be asked to refrain from other activities outside the institute, but one's involvement in other jobs cannot be at the cost of the parent institute. Hence each teacher will strive for attaining at least the landmark of β^* if he is to retain the present job.

In fact, the threat of retaining the job may come from another source at any time. If a person's conduct is questionable, or he is involved in some activities not socially acceptable, or he is convicted in some police cases, he may be suspended and even be thrown from the job. However, the decision can be taken only by an independent committee formed for this purpose. At the start of job, the incumbent should keep in mind this clause.

Given our scheme, one can easily note that the incentive of giving tuition is drastically reduced. One person is not prevented from giving private tuition, but he can do it by only foregoing a part of his salary. So he will have to make a trade-off. Also he has the threat of hovering around the parameter, β^*. So if a person keeps up retaining a high value of β, and at the same time continues giving private tuition, it is truely welfare improving.

There are some activities of teachers that enhance reputation of the institute as well. For example, some activities of the teachers are rewarded at

the regional, national or international level. The respective institute should encourage these activities by giving the person conerned an appreciation for his work through organizing a ceremony.

There are some other issues which we have to sort out. If a teacher takes an academic leave for some purpose that is expected to enhance his teaching or research potential, such a leave should be considered as his regular job, and he will be allowed to get usual annual increments.

Some institutes may not have regular teaching program, or teaching is not considered compulsory. In such a case it is not difficult to design a scheme which will consider teaching and research as subsitutes for each other. A decision on the trade off between teaching and research will have to be agreed upon.

Associated with the above scheme one should expect that the employer will commit at least the followings.

(i) Arrears of all kinds, if any, will be paid as soon as possible.[11]

(ii) Salary per month will be disbursed not later than the last working day of the month.

(iii) Retirement benefits will be perfectly regularized.

(iv) There will be provision for accidental benefits, including giving appropriate appointment to the nearest kin of the incumbent in case of incumbent's death.

In the below we are giving an arbitrary example of determining gross salary of a teacher.

An illustration: Let the parameters take following values. $B_0 = \text{Rs}10{,}000/$, $\alpha_0 = .05$, $\alpha_i = .i$, $(i = 1, 2, ..., n), \beta^* = 1$; these are applicable to all persons. Suppose that the performance of a person in the second year $(t = 1)$ of his service is evaluated (at the end of the period) as $r_i = .6 \forall i$. When he joined

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[11]In fact, arrears should be paid along with interest. This will reduce the tendency of delayed payment.

the service, he has Ph.D. degree. Also suppose that inflation rate is zero. Then gross salary in the second year will be as follows:

When he joined, his basic salary (with three additional increments for Ph.D.) is

$$A_0 = (1 + 3\alpha_0)B_0 = (1.15)(10,000) = 11500.$$

Now, $\beta_1 = \sum \alpha_i r_i = .6(.1 + .2 + .3 + .4 + .5 + .6) = 1.26 > \beta^*$. Hence his second year per month salary will be

$$S_1 = (1 + 4\alpha_0)B_0[1 + \beta_1] = (1.2)(10,000)(2.26) = 27120.$$

It may be recalled that in the above scheme the parameters are B_0, β^* and all α_is $(i = 0, 1, 2....n)$, including h. The value of τ (inflation rate) is known from other source. But to implement the scheme it is required to estimate for each and every teacher the values of all r_is $(i = 1, 2, ...n)$. Hence implementation of the scheme involves an additional administrative cost for each institute.

3   Promotion

In this section we consider an incentive scheme for promotion to a higher scale. Let us consider the existence of three tiers of scale, viz., Lecturer, Reader and Professor. Quite obviously, the minimum basic pay (B_0) and rate of annual increments (α_0) will be higher as we move up to the ladder. Therefore,

$$B_0^L < B_0^R < B_0^P, \text{ and } \alpha_0^L < \alpha_0^R < \alpha_0^P.$$

Let us first consider the question of promotion from the position of Lecturer to Reader. Assume that in the usual course a Lecturer requires T^* years of service to get promotion to the reader scale. Now consider the following incentive scheme for promotion from Lecturer to Reader. Let us define a parameter, β^{**}, $\beta^{**} > \beta^*$, and also $t^{**} < T^*$. Then a teacher will be promoted

to the ¿reader scale if he achieves $\beta \geq \beta^{**}$ at least t^{**} times. Combining these two, we get that the minimum number of years for promotion is $\min[t^{**}, T^*]$.

In the above scheme the promotion from Lecturer to Reader is quite straightforward. But we suggest a little bit complicated scheme for promotion to Professor. First of all, if a teacher works at least T^{**} years in the reader scale, only then he may apply for the position of Professor. For each subject there will be a selection committee. The committee is supposed to review the track record of the values of β over the length of his service. And it will look into research outputs and overall academic performance of the applicant. If the committee is satisfied with the performance, the teacher concerned should be promoted to the professor scale.

Finally, promotion to Reader and Professor should not be just as rigid; there are some exceptional cases. A candidate, even with no past teaching experience, may get promotion or appointment to the position of a Reader or Professor if he has already a very good quality of a requisite number of research publications. The merit of such extra-ordinary cases should be judged only by the qualified committee.

4 Conclusion

We find that there are some very good teachers who teach with all sorts of care and devotion, and again there are teachers who are hardly capable of teaching; some teachers take lot of teaching load while others have very little burden of teaching; some teachers do good research along with teaching responsibility, and the others are hardly involved in meaningful research; some teachers are very sincere in their profession, and some are busy in the outside-institute job. Can we distinguish these categories? And if we can, why will not then the sincere and capable teachers be rewarded for their superior activities? Unless we can do so meaningfully, teachers, in general,

will have less incentive to do hard work. In the present paper an incentive based reward scheme has been proposed for teachers, and by this the society can fully explore the teaching and research potential of our teachers. The existing salary structure neither promotes teaching, nor encourages research, nor it provides incentives for taking up these activities. Just a fat salary will be unproductive and hence be drainage of scarce resources. Associated with this is the need that students take education seriously. One way to do this is to restrict higher education.[12] Education should not be a free good. If the students pay money, they will understand the utility of education. This will also make the teachers disciplined and the guardians more sincere about the activities of their wards in the university and colleges. There should be provision for lot of scholarships, but these will be competitive and be awarded strictly on the basis of merit and performance. Our objective should be producing quality, and not simply quantity.

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[12]This is again a debatable issue.

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