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AN EXPLANATION AND MODELING OF TEACHERS' SALARY BASED ON PERSONAL VARIABLES IN EDUCATION ORGANIZATION OF ZANDJAN PROVINCE

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Abstract. The main purpose of this research was whether compensation system in education organization of Zandjan province can distinguish between employees based on their personal characteristics. To meet the purpose, Of 12950 monthly paid teachers in different age, academic paper, organizational positions and length of service, Finally 2554 of employees were selected based on cluster random sampling in 5 cluster that each cluster represents one area. To analyze the research questions, descriptive and inferential statistics like path analysis and discriminant analysis using by Spss 11.0 were served. The relationship between outcome variable, monthly salary, and Job category is 0.73 and between monthly salary and length 0f service is 0.815.Both of them were significant (P<.01), showing that there is a positive and direct relationship between variables. Finally the causal model encompassing personal variables influencing the salary is drawn.

Key words: education-pay-merit pay-career ladder

1. Introduction

Teachers' compensation has long been a critical concern of policy makers in Iran so that one of the most important promises of education minister and even presidential candidates have been an increase in teachers' salaries. Teacher pay in the public sector of iran is not market-based. Rather, pay is determined by salary schedules that base pay on some personal variables.

In 2007, The Islamic Consultative Assembly of Iran, enacted a law consisting of 128 articles to reconstruct and to enhance quality of services of public section services. Government initiated its renovation plan named the "Country Services Management" act toward modernization of the public services and administration. One of the most important and controversial parts of the act is compensation system. It is claimed that in the current act, humane and motivation aspects are considered, and employees' motivation will be improved due to restoration of bureaucratic structure to achieve social justice.

According to article 64, the act prescribes that "the compensation system of public section employees should be based on evaluating of occupations' and employees' factors such as job complexity, supervisory level, certificate, years of service and etc. and the results would lead to score."

Since the advent of organizational science, pay has been considered an important reward to motivate the behavior of employees (Taylor, 1911).In continuation, Research focused on determining how pay motivates employees used reinforcement (Skinner, 1953) and expectancy (Vroom, 1964) theories to suggest that based on an individual's prior experience, if an individual expect to receive something of value if he or she engages in a behavior, he or she will engage in that behavior.

Heneman and Schwab (1979) suggested that pay can be broken into four distinct categories: pay level, pay structure, pay system, and pay form.

According to Heneman and Schwab (1979) defined these as follows:

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1. Pay level is the average of several wages or salaries in the organization. The average may be based on individual pay rates for a single position or on pay averages for a number of positions.

2. Pay structure is the hierarchy of pay rates or levels among jobs in an organization.

3. Pay system is the method is used to determine pay raises for individuals which can be computed in terms of the amount of time the employee spends on the job (time-based systems) or for his performance or efficiency (performance-based systems).

4. Pay form is the type of pay that is received by the employee. Pay may be viewed as direct remuneration for time worked or performance, or it may be viewed as indirect remuneration in the form of fringe benefits or services.

Performance-based systems include individual and group incentive systems, merit systems, commissions, cost-reduction schemes, and profit sharing.

Gerhart and Milkovich (1992) suggest compensation decisions can be classified into four distinct areas of compensation policy. The first is the pay-level policy, which determines whether a firm will have a lead, lag, or match policy. The second involves how organizations determine individual-level pay differentiation decisions – whether decisions will be related to performance or to length of service. The third decision is the pay structure policy that determines the pay differences between levels of the organizational hierarchy.

2. Research previous

There are multiple types of alternative pay including merit pay, career ladder, skills- and knowledge-based pay, and performance pay, which are described in the next sections.

2.1. Merit pay

Merit pay provides compensation for higher levels of performance (Ellis, Thomas I, 1984). A standard for individual performance is set, such as increased student achievement. In case of meeting this standard, the teacher receives an increase in salary (Firestone & Pennell, 1993).

2.2. Career ladder

Introduced in the 1980s, the career ladder, is another type of teacher compensation. There are three kinds of career ladder programs: performance based, job enlargement, and professional development (National Association of State Boards of Education [NASBE], 2002). Performance-based ladders promote teachers as they show increased levels of competency (i.e., fresh teacher). Job-enlargement ladders can engage teachers in additional responsibilities outside of the classroom. Professional development ladders reward teachers for developing knowledge or skills through professional development, advanced degrees, or National Board of Professional Teaching Standards (NBPTS) certification. Career ladders were created to address the flat career structure of teaching and the lack of opportunities for improvement (Odden & Kelley, 2002). Career ladders have some evidence of effectiveness, but are difficult to sustain(Odden & Kelley, 2002).

2.3. Knowledge and skills pay

Recent alternative teacher compensation programs encourage teachers for developing skills and knowledge to meet higher standards. Knowledge- and skills-based pays are two types of this category. Teachers in this system often take education units based on personal interest and are rewarded for taking courses that do not meet the school's needs (Kelley, 1997). In a knowledge- and skills-based system, teachers are compensated for the acquisition of the specific knowledge and skills required to meet higher expectations for performance. This system is similar to the professional development career ladder.

2.4. Performance pay

Performance pay is another form of alternative teacher compensation that can be awarded on an individual or group level (Odden & Kelley, 2002). In the past, the most common form of individual performance pay was merit pay.

Skill- and knowledge-based pay and group performance awards appear to be directly supportive of recent school reforms (Mohrman et al., 1996; Odden & Kelley, 2002). These two compensation plans recognize high standards and high teacher involvement (Kelley, 1997).

The findings of a research revealed that teacher performance pay led to significant improvements in student test scores, with no evidence of any adverse consequences of the program. Additional schooling inputs were also effective in raising test scores, but the teacher incentive programs were three times as cost effective in raising test scores (Muralidharan and Sundararaman 2008).

Salary is a controversial subject among teachers and politicians. The importance of the amount of salary has been a key issue in debates, discussions and in some cases, It has led to strike and unrest. One of the most important factors affecting the quality of education is the quality of the teacher. There are obvious evidences that a teacher's quality is the most influential factor of student achievement. Regardless of vast variety of resources that are provided in the wake of scientific improvements, the primary source of learning for students is teacher.

The key research question for this paper, therefore, is whether teachers' monthly salary is an important issue to distinguish them, considering their organizational and personal differences.

This paper attempts to answer the following questions: (i) Is there a correlation between monthly salary and job category? (ii) Is there a correlation between monthly salary and Length of Service? (iii) What are the share of predictor variable in explanation of teachers' monthly salary? (iv) Based on monthly salary, how many percent of teachers' academic paper and position is preditable?(vi) What is the direct and indirect impacts of personal variables on teachers' salary?

3. Sample and data collection

This study used cross-sectional research design using financial documents of year 1388(Hijri Shamsi calendar), and dealt with a sample of 2554 Zanjan province teachers' in Islamic Republic of Iran, after data management and exclusion of some observations. Teachers were selected by means of a cluster random sample process. Of 14 areas in the province including 12950 paid teachers (excluding part-time ones), finally 2554 teachers in five area were selected. They were from three different organizational position named primary school teachers, theoretical teachers and technical teachers. The sample encompasses 594 men and 1462 women. The mean of age and years of service were 36.5 and 14.7 respectively. The majority of samples have bachelor certification (58.1%) and considering their position, 36.9 per cent were primary schools teachers, 59.4 per cent were theoretical teachers and only 3.6 per cent were technical teachers.

The unit of analysis for this study was teachers who have worked as monthly paid teacher. At the initial stage of data collection, the researchers obtained official permission from the Headquarter of education organization of Zanjan to conduct this study in any of the 14 areas throughout the education offices of Zanjan province.

4. Results

4.1. Teachers' Demographic Characteristics

Table 1 shows the sample profile for this study. In terms of gender structure, females (57.2%) were larger than males (42.8%). The mean of participants was aged 36.5 and, the mean of length of services was 14.7. A large number had bachelor degree (58.1%). The majority of participants were theoretical teachers (59.4%). Most of the participants were in the Nahie 2 Zanjan area (60.5%). Finally, the mean and standard deviation of the participants was 5,608,771.7 Rials and 726,849.9 respectively.

Table 1. Sample Profile (N=2554)

Gender (%)	**Academic Paper (%)**	**Position (%)**
Male =42.8 Female=57.2	Diploma=4.2 Associate of arts=31.0 Bachelor=58.1 Master=6.7	Primary schools teachers=36.9 theoretical teachers=59.4 technical teachers=3.6
Teachers of sample areas(N)	**Age (Years)**	**Length of Service (Years)**
Sojas Rood=241 Eej Rood=228 Mahneshan=147 Tarom=393 Nahie 2=1545 Total=2554	Mean=36.5 Minimum=21 Maximum=58 Std. deviation=6.3	Mean=14.7 Minimum=1 Maximum=30 Std. deviation=5.7
Monthly Salary(Rials)		
Mean= 5,608,771.7 Minimum= 4,092,700 Maximum= 8,949,413 Std. deviation= 726,849.9		

Table 1 shows the distribution of dependent variable. A stem and leaf diagram provides a visual summary of data. It allows detect the distributional pattern of the data. Because normality of distribution of dependent variable in inferential statistical tests is crucial, meeting the assumptions is necessary. Based on skewness coefficient and shape of distribution it is reasonable to assume that it is fitted on normal curve.

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Frequency    Stem &  Leaf

    4.00        4 .  &
   25.00        4 .  33&
  154.00        4 .  444444444555555
   42.00        4 .  6667
   93.00        4 .  8899999999
  483.00        5 .  000000000000000000000000000011111111111111111111
  383.00        5 .  22222222222223333333333333333333333333
  286.00        5 .  444444444444444455555555555555
  232.00        5 .  66666666666777777777777
  220.00        5 .  8888888888999999999999
  192.00        6 .  0000000001111111111
  133.00        6 .  2222222333333
   89.00        6 .  444445555
   58.00        6 .  66677
   39.00        6 .  8899
   25.00        7 .  01
   12.00        7 .  2&
   84.00 Extremes    (>=7328823)

Stem width:    1000000
Each leaf:       10 case(s)
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Figure 1. Stem and leaf plot of monthly salary (outcome variable)

Table 2 shows the results of Pearson correlation analysis of research variables. The correlation coefficients for the relationship between the outcome variable (monthly salary) with the predictor variables such as job category, length of services is .73 and .5 respectively which are significant at 0.01.

Table 2. Pearson Correlation Analysis

Monthly Salary	Job category		
.730(**)	-	Pearson Correlation	Job category
.000	-	Sig. (2-tailed)	
2554	-	N	
-	.815(**)	Pearson Correlation	Monthly Salary
-	.000	Sig. (2-tailed)	
-	2554	N	
.502(**)	-	Pearson Correlation	Length of Service
.000	-	Sig. (2-tailed)	
2554	-	N	

Note: Significant at *p<0.05; **p<0.01

Table 2 shows the results of Pearson correlation analysis. The relationship between outcome variable, monthly salary, and Job category is 0.73 and between monthly salary and length 0f service is 0.815.Both of them were significant (P<.01), showing that there is a positive and direct relationship between variables.

Table 3. Result for Stepwise Multiple Regression Analysis

Model		**Sum of Squares**	**df**	**F**	**Sig.**	**R**	**R Square**
	Regression	711289932852522.0	1	2847.446	.000	.726	.52
	Residual	637487650942962.0	2552				
	Total	1348777583795484.0	2553				
	Regression	729973902143249.0	2	1504.648	.000	.736	.54
	Residual	618803681652235.0	2551				
	Total	1348777583795484.0	2553				
	Regression	732855521906908.0	3	1011.373	.000	.737	.54
	Residual	615922061888576.0	2550				
	Total	1348777583795484.0	2553				
	Regression	739074799214408.0	4	772.467	.000	.74	.54
	Residual	609702784581075.0	2549				
	Total	1348777583795484.0	2553				

To answer the question of research, a stepwise multiple regression analysis was used to assess the magnitude and the share of the predictors including age, job category, academic paper and length of service in explanation of outcome variable. As it is showed in table 3, in the Step 3 had explained 54% of the variance outcome variable. Therefore, In terms of explanatory power, the model supports 54% of the variance outcome variable.

Table 4. Result for Discriminant Analysis to Predict teachers' Academic Paper

		Predicted Group Membership				Total
Academic Paper		Diploma	Associate of arts	Bachelor	Master	
Count	Diploma	74	5	22	5	106
	Associate of arts	467	65	224	37	793
	Bachelor	361	304	638	182	1485
	Master	5	2	33	130	170
%	Diploma	69.8	4.7	20.8	4.7	100.0
	Associate of arts	58.9	8.2	28.2	4.7	100.0
	Bachelor	24.3	20.5	43.0	12.3	100.0
	Master	2.9	1.2	19.4	76.5	100.0

Note: 35.5% of original grouped cases correctly classified.

To answer two research questions, we tried to use discriminant analysis to predict that how many percent of personal variables like teachers' organizational position and academic paper correctly is predictable based on their salaries.

Discriminant function analysis is used to determine which continuous variables discriminate between two or more naturally occurring groups (Dilon andGoldestein,1978).Discriminant analysis is most often used to help a researcher predict the group or category to which a subject belongs.

As is shown in table 4, by taking salary as outcome variable, 35.5 percent of teachers' academic paper is categorized correctly and teachers holding master degree are predicted well. On the contrary, the model in predicting teachers with Associate of arts academic paper has not been successful.

Table 5. Result for Discriminant Analysis to Predict teachers' Organizational Position

		Predicted Group Membership			Total
Count	Position	Primary school teachers	Theoretical teachers	Technical teachers	
	Primary school teachers	609	60	274	943
	Theoretical teachers	799	100	619	1518
	Technical teachers	42	6	45	93
%	Primary school teachers	64.6	6.4	29.1	100.0
	Theoretical teachers	52.6	6.6	40.8	100.0
	Technical teachers	45.2	6.5	48.4	100.0

Note: 29.5% of original grouped cases correctly classified.

According to table 5, using discriminant analysis to predict teachers' position, the model has predicted totally 29.5 percent of their position correctly that the success of prediction among primary school teachers and theoretical teachers is 64.6 and 6.6 percent respectively.

In the logic of causal order, the correlation between two variables can not necessarily be meant causal relationship between them. Path analysis represents an attempt to deal with causal types of relationships. It is a method employed to determine whether or not a multivariate set of nonexperimental data fits well with a particular (a priori) causal model.

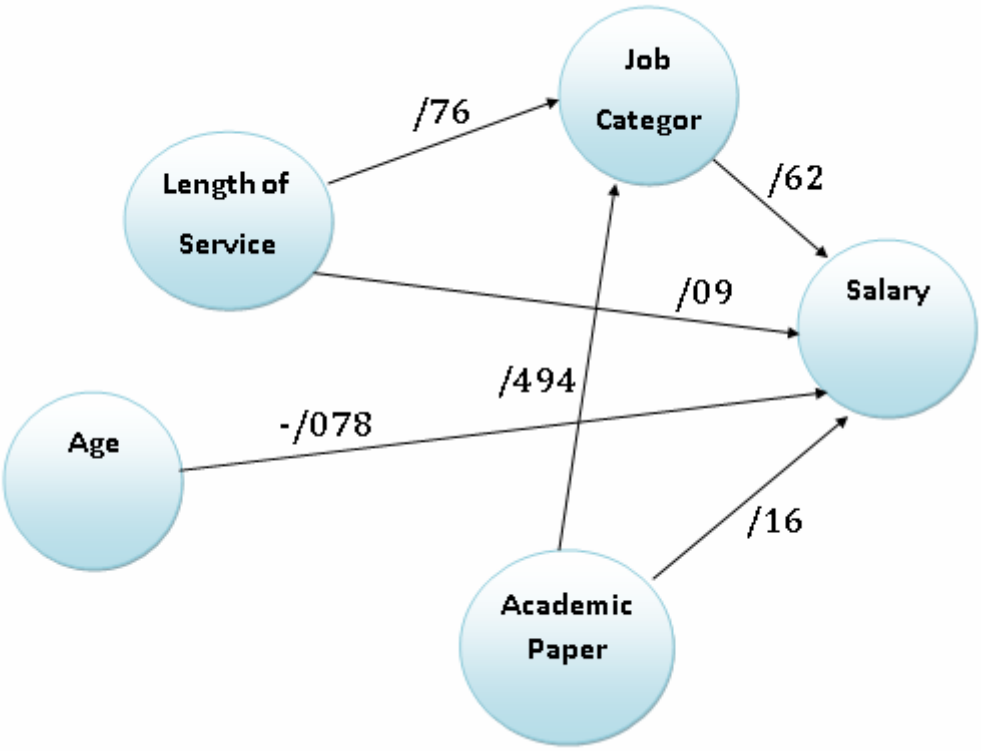

Figure 2. Direct and indirect factors influencing salary

Each circle in Figure 1 represents a variable. In this diagram age, length of service and academic paper are considered to be exogenous variables. Any correlation between these variables may actually be casual and may be due to 1 and 2 sharing common causes. Salary and job category are endogenous variables in this model and their variance is considered to be explained in part by other variables in the model. Variance in salary is theorized to result from variance in age, length of service, academic paper, job category and extraneous (not in the model) sources and variance in job category is theorized to be caused by variance in length of service, academic paper, and extraneous sources.

For each path to an endogenous variable we shall calculate a path coefficient, p_{ij}, where "i" indicates the effect and "j" the cause. If we square a path coefficient we get the proportion of the affected variable's variance that is caused by the causal variable.

A path analysis can be conducted using multiple regression analysis. The beta weights from these multiple regressions are the path coefficients shown in the typical figures that are used to display the results of a path analysis.

The correlation between two variables may be decomposed into four components:

1. the direct effect of X on Y,
2. the indirect effect of X (through an intervening variable) on Y,
3. an unanalyzed component due to our not knowing the direction of causation for a path, and

4. a spurious component due to X and Y each being caused by some third variable or set of variables in the model (Pedhazur1982).

To determine the total direct and indirect effects on salary -, the ultimate figures show the importance and share of each variable as is shown in table 6.Note that the total effect of X on Y equals the sum of X's direct and indirect effects on Y.

Table 6. Total direct and indirect effects on salary

Variable	Direct Effect	Indirect Effect	Total
Length of Service	0.095	0.475	0.57
Job Category	0.622	0	0.622
Academic Paper	0.164	0.307	0.471
Age	0.078	0	0.078

5. Conclusion

This study is carried out to measure the effect of personal variables affecting teachers' salary and, ability of payment salary system in education system of Iran to make distinguish between them based on independent variables such as organizational position and academic paper as well. From the results it can be concluded that personal variables have significant impact on salary. However, paying attention to select valid and reliable variables is necessary.

The single-salary schedule is now the norm, but it may not meet the needs of the current education system. In other words, such a system does not meet the complexity of today's education systems (Kelley, 2002).

In sum, skill- and knowledge-based pay and group performance awards appear to be directly supportive of recent school reforms (Mohrman et al., 1996; Odden & Kelley, 2002). These two compensation plans recognize high standards and high teacher involvement (Kelley, 1997).

the issue of the optimal formula for teacher performance pay has not been resolved,

and implementation concerns are very real.

The internal equity is the consistency internally. This will also have the job comparison within the organization and to its relative contribution. On the other hand, the external equity is simply the competitiveness externally and the position of the employers in connection to the fact that it is connected to its competitiveness towards its the amount he is willing to pay (Brook, 2007).

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