Determinants of labor wage: A study on cement manufacturing industries in Bangladesh

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Abstract:
Manufacturing industries are playing a pivotal role in the labor market of Bangladesh. Among all other manufacturing industries, the cement manufacturing industries are the rapidly growing industries in Bangladesh. This study inspects the determinants of labor wage of cement manufacturing industries in Bangladesh using the model of econometric program SPSS (20.0). The variables are knowledge of information technology, education, job experience, and age. The regression results show a significant impact in all variables. The main findings of this study are education, age, and job experience positively invigorate labor wage, and knowledge of information technology has a negative impact on labor wage.

Keywords: Education, Age, Job experience, Knowledge of information technology

Introduction:
The Human capital theory explained, even though disputed, the determinants of labor wage in the labor market. Actually, in the labor market, there are several variables influencing labor wage. Over the years, Researchers tried to posit a model to determine labor wage but some of the variables, such as bargaining and minimum wage, remain undetermined. Joshua Healy (2016) found that despite positive signs in the labor market of Australia, several factors remain stagnant and weak. The classical economists explained this condition of labor wage through the supply and demand of labor.
As Bangladesh is a rapidly growing nation, the determinant of labor wage is a pivotal issue in the labor market. It can be defined through several variables in the labor market. In a competitive market, labor wages varied from industry to industry. Thomas Turner (1994) stated that due to flexibility of labor and pricing of labor, the relationship of employment is significantly changing. In the context of cement manufacturing industries, this market is lucrative due to the increasing number of industries over the last five years. As a result, every year a huge number of workers are entering into these industries. This research paper investigates how the labor wage is determined and what are variables are influencing labor wage.
Objective: To determine the labor wage education, age, job experience and knowledge of information technology are the key variable. The objectives of this study are:
1. To examine the impact of education on labor wage
2. To check out the impact of age on labor wage
3. To analyze the impact of job experience on labor wage
4. To check out the impact of knowledge of information technology on labor wage

Literature review:

Kazi Abrar Hossain, et all (2015) investigated all the relevant factors influencing labor income, especially in Bangladesh. They established the model by using data from a survey and found that education, skills, age have a great influence on labor income. They also assayed all factors and suggest some policies for the betterment of the labor market. Richard B. Freeman (1980) examined the variances of the labor wage of United States' private companies. He found that intensive strategy and policies determine the labor wage in the labor market and also stated that trade union helps to determine labor wage and reduce wage variance. Thomas R. MacCurdy and John H. Pencavel (1986) explained the labor wage through the demand curve and contract curve. They used this model particularly in newspaper and typographical sectors. They found the inconsistency in the demand curve but the other curve described closely labor wage in a particular sector. LarsOsberg, et all (1986) examined the labor market using job mobility and hypothesis. They found a variance of labor wages in different sectors in the labor market. They collected data from survey reports and posited that job mobility is a key factor to determine wages in the labor market. Zhong Zhao (2005) investigated the migration issue of rural-urban through four factors. Household, profile, explanation, and interaction of rural-urban issue influence labor wage. They cannot posit determinants of labor wage and proposed further research needed for this issue. LarsCalmfors and Anders Forslund (1991) investigated the European labor market and policies to understand the labor wage situation. They established a model which described the relationship between wage-setting in the labor market. They also presented theoretical explanation and regression analysis to understand the labor wage in the European market. Peter A. Diamond (1982) investigated labor wage using Nash Bargaining and search technology. They found a stagnant situation in labor wage. He compared between wages of new employees and the output of new employees which is not efficient. G.B. Rodgers (1975) assayed all variables of the labor market and posited a theory for wage determinants. They collected data from the rural low wage level labor market in India. He found that labor wage is not an independent variable and also found differences in equilibrium theory. He also found that the wage level of this labor market is stagnant.

Development of Hypothesis:

Reviewing research findings and relevant literature, the hypothesis and framework are developed through job experience, age, education, and knowledge of information technology.

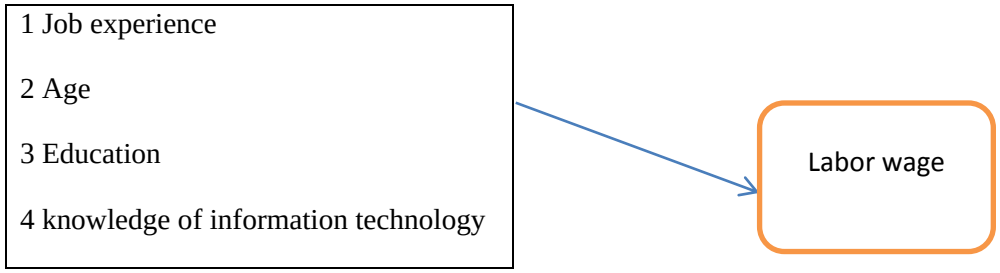

Figure 1: Framework of variables

Impact of Knowledge of Information Technology on labor wage:

Charles Craypo and David Cormier (2000) found a positive relationship between technological knowledge and labor wage in the labor market. They stated that the labor market is gradually transforming into a technological-based market where the demand for technological knowledge is higher. Pepper D. Culpepper (2008) also found that higher wage in the labor market depends on the

technological knowledge. Timothy F. Bresnahan, et all (2002) focused that the demand for technological knowledge is greater in the labor market. I assumed the hypothesis below:

H1: knowledge of Information Technology (IT) has positive impact on the labor wages.

Impact of Job experience on labor wage:

Damian Oliver (2015) found a significantly positive relation between experienced and wage. He emphasized that experienced, skill, and qualification determine the labor wage. Mathew j Lindquist (2004) constructed a model which proved that the demand for experienced workers is higher in the labor market. Joachim Moller (2010) emphasized that a firm's growth depends on experienced and highly professional work and also stated that job experience and wage are positively significant in a firm.

I assumed hypothesis bellow:

H2: Job Experienced has positive impact on the labor wages in the labor market.

Impact of Education on labor wage:

Berg, Ivar (1970) found a positive and significant relationship between higher education and labor wage. He investigated data, assumptions, and hypotheses about education and wage which showed education and wage are significantly interrelated. Solomon William Polachek (1975) found that a positive relationship between wages and education and stated that education has a significant impact in the labor market to earn higher wages. Jacques van der Gaag and Wim Vijverberg (1989) emphasized that the rate of a wage depends on higher education. Jeffrey Pfeffer and Nancy Langton (1993) also found that educational degree from college and university has a significant relationship with labor wage in the labor market. **I assumed the hypothesis below:**

H3: Education has positive impact on the labor wage in labor market.

Impact of age on labor wage:

Jennifer Hunt (2006) found that the relationship between age and wage is significant in the labor market. He also stated that the differences in wage depend on the age of the labor. Peter Fredriksson and Bijorn Ockert (2005) found that the labor market has a positive relationship between age and wage. They stated that Employees give higher performance and get higher wages from the labor market because of maturity. I assume hypothesis bellow-

H4: Age has positive impact on the labor wage in labor market

Research methodology:

Sample selection:

According to the Bangladesh government, there are now 74 cement manufacturing companies while it was only 30 in 2010. It is the rapidly growing manufacturing sector in Bangladesh in recent time. To facilitate research study and bring perfection to my study, I selected ten leading cement manufacturing companies. The name of the sample cement manufacturing companies is given below.

Table 1: Sample cement company ltd. in Bangladesh:

1.Alhaj Mostafa-Hakim cement industries limited
2.Premier cement mills limited
3.Shah cement industries limited
4.Mir cement limited
5.Madina cement industries limited
6.Mongla cement factory limited
7.M.I cement factory limited
8.Diamond cement limited
9.Royal cement limited
10.Aramit cement limited

Data collection method:

The primary data is collected from the department of human resource management (HRM). A resourceful questioner is prepared to take an interview from the executive or Head of human resource management (HRM). I totally have taken ten personal interviews for my research. The secondary data is taken through research findings, literature reviews, and library work. All data are classified as dependent and independent variables which are given below.

Table 2: Independent and dependent variables

Independent variable	Dependent variable
1. knowledge of information technology	1. Labor wage
2. job experienced	
3. public university	
4. private university	

Model specification:

To determine the labor wage in cement manufacturing industries in Bangladesh, a single simple linear regression model is developed which is given below.

$$LW = B0 + B1IT + B2\ JE + B3E + B4A + Ur \ldots\ldots\ldots (1)$$

Where,
LW= Labor wage
IT= knowledge of information technology
JE= Job experienced
E= Education

A= Age

Empirical results:

Table 3: Regression result

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	**Std. Error**	**Beta**		
1.	**(Constant)**	9313.559	316.625		29.415	.000
	Education	1766.949	233.220	774	7.576	.001
	Age	-665.254	318.305	-.291	-2.090	.091
	IT	-1394.068	275.176	-.598	-5.066	.004
	Job Experience	402.542	356.250	.141	1.130	.310

source: Author's estimation
a. Dependent Variable: Remuneration

From table 3, the estimated coefficient can be derived that education, age, and job experience have a significant positive impact on labor wage while knowledge of information technology has a negative significance on labor wage in manufacturing industries in Bangladesh. The coefficient of T-value of education, age, knowledge of information technology, job experience is 1766.949, -665.254, -1394.068, 402.542respectively which are statistically significant on labor wage if all other variables remain constant. The estimated regression line is given below:

LW= B0 + 1766.949 E - 665.254 Ag -1394.068 IT+ 402.542 JE +Ui

Table 4: Model summery

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.976[a]	.952	.913	354.74985	.952	24.625	4	5	.002	.887

Source: Author's estimation

a. Predictors: (Constant), Job Experience, IT Knowledge, Private University, Public University

b. Dependent Variable: Remuneration

From table 2, the value of R square is .952 which is fitted well. the variation is 95.2% in the labor wage in manufacturing industries in Bangladesh which is stated by education, age, job experience, and knowledge of information technology. The D-statistics value is .887. For N 10 and k 4 the statistics of Durbin-Watson dl= .376 and Du= 2.414 at a 5% level of significance. From Dl and Du, it can be derived that Dl is less than Du which is statistically significant.

Table 5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12395762.712	4	3098940.678	24.625	.002[b]
	Residual	629237.288	5	125847.458		
	Total	13025000.000	9			

a. Dependent Variable: Remuneration

b. Predictors: (Constant), Experience, IT, Private, Public

Source: Author's estimation

The value of the F test is 24.625 which critical value is 3.63 at a 5% level of significance and 6.42 at a 1% level of significance. The F test value of 24.625 states that the R square is significant. Moreover, P=.002

shows the impact of the independent variable on the dependent variable is significant. So it is found that the model is significant.

Conclusion:

The current study found that the developed model is significant in evaluating the roles of education, age, job experience, and information technology as determinants in considering labor wages in the manufacturing company in Bangladesh. Besides, education, age, and job experience have a significant positive impact on labor wage while knowledge of information technology has a negative sign on labor wage in manufacturing industries in Bangladesh. It may be expected that further study might be taken to analyze the rapid growth of information technology and its implications on the manufacturing companies in Bangladesh.

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