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An Econometric Study of Labor Market in Sri Lanka with Special Reference to Demographic Characteristics of Labor

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Abstract: The wage in labor market has drastically changed during the past centuryand gone through different stages and changed with socioeconomic determinants. Among the concepts of labor, demand and supply of labor are very important in practical sense. The determination of wages in a free market simply depends on the socioeconomic characteristics of the labor force. Therefore, an attempt is made to explore the relationships between the wage rates and demographic characteristics of labor force using econometric methods.

The required data are obtained from the records of Labor Force and Socioeconomic Survey conducted by the Department of Census and Statistics. An econometric model for wage rates using the demographic characteristics as independent variables is fitted and verified. The study reveals that age, gender, civil status, ethnicity etc. have significant influences in determining the wages. Hence, it is emphasized that the demographic characteristics should be taken into consideration whendetermining the wages of aparticular labor force inherited in the respective areas of the country.

This study specifically reports that the general effect of hourly wage rate in Sri Lanka is 2.566 when ignoring the socio-demographic characteristics of labor force and the average hourly wage rate difference by gender is 0.294 and difference by marital status is 0.162. Further, the average hourly wage rate differences in the three ethnic groups Sinhalese, Sri Lankan Tamil, and Indian Tamil were individually found to be 0.034, 0.008, and 0.352 discriminated from rest of the ethnic groups. Similar hourly wage rate differences for employees of the Government sector and Semi-government sector were found to be 0.28.and 0.19. The effects or differences in hourly wage rates due to educational levels and literacy rates of the employees in Sri Lankan labor market are also reported in this study.

Key Words: Wage Rates, Demographic Characters, Econometric Model, Heteroscedasticity, Multicolinearity.

Introduction

The poor people, especially the people of labor force, are the most valuable resources of a nation (Elley and Irving, 1977). They virtually determine the economic growth of the country by active participation in economic development activities. The dynamic operation of an economy depends, to a great extent, on the employment of people. There is an inseparable relationship between labor market and economy. It plays an important role in the development of economy.

Wage theory is an old economic theory and during the last two centuries it has gone through different stages of evolution. Among those theories demand and supply of wages is very important for frequent verification. The theory of the determination of wages in a free market is simply a special case of the general theory of value. Wages are the price of labor; and thus in the absence of control, they are determined like all prices, by supply and demand.

Determination of wages is related with the factor market. The most important characteristic of the labor market that distinguish from all other markets is that the item being exchanged is embodied in human beings. If we consider the workers in labor market they differ by age, gender, education, experiences, specific skills, shelter etc. The multiplicity of the market can occur according to the ethnicity, geographical location, demographic characteristics, their skills etc.

A wage is a form of remuneration paid by an employer to an employee which is calculated on the basis of some piece of work. Compensation, in terms of wages, is given to the workers and by salary to the employees. Compensation is a monetary benefit given to employees in return for the services provided by them.On the demand side the employers do not want to pay more than the marginal productivity of labor and on the supply side the employees do not want to accept less than what is required to keep their standard of living. The actual rate will largely depends upon the relative bargaining powers of the employees (Jiwitesh, K., 1998).

Theoretical framework

The labor market is very competitive and different factors have influenced the changing wage rates. Different studies have explored various factors, which influence the determination of wage rates.

According to Robert l. Lerman, marriage increases a person's earnings by about 20 percent.It also shows a rise in wage rates and the hours worked after marriage. These findings suggest that both marriage enhancing and earnings-enhancing policies can set off a virtuous circle, in which marriage and earnings reinforce each other over time. Unmarried man who appearsto be unable to support a family because of low current earnings is likely to become more adequate breadwinners once they marry (Robert I. Lermanand AvnerAhituv, 2004).

The above findings are further explainedin a different study that the magnitudes are generally higher than comparable wage and hours effects on divorce and remarriage. A 10 percent increase wage rates lowered the probability of divorce (among those initially married) by 4.0 percent and raised the probability of remarriage (among those initially divorced or separated) by about 1.7 percent. A 10 percent rise in hours worked had no effect on entry into divorce and raised the entry probabilities into remarriage by 2.7 percent (Robert I. Lerman and AvnerAhituv, 2005).

Labor force is drawn from the rural regions to the urban region with the prospects of higher wages and un-interrupted employment. Labor migration continues until the point of equalization of the rural and urban expected wages. The expected earnings of the rural sector is the actual rural wages, while that of the urban sector is the actual wages multiplied by the probability of getting a job, which is taken to be the urban employment rate (Priniti P, 2003).

The above article uses data from the Survey of Labor and Income Dynamics (SLID) to investigate the extent to which factors not previously explored in the Canadian context account for wage differences between men and women. Like other studies using standard decomposition techniques, it found that men still enjoy a wage advantage over women.Women's average hourly wage rate is about 84% to 89% of the men's average wage rate. Unlike the other studies, controls for work history and job-related responsibilities are used.

Objectives of the Study

The general objective of this study is to identify the impacts of socioeconomic determinants of hourly wage rate in the labor market of Sri Lanka. The specific concentration on this objective is to confine with important demographic characteristics of the laborers in the labor force in Sri Lanka.

In any country the main goalof economic planners is to achieve a better economic growth rate coinciding with visible higher development outcomes. Therefore effective employment conditions are very important for achievingsuch economic growth. There are different factors affecting the employment of laborers. Wages are very important components in the

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labor market. Wages depend on the different basic factors such as age, education level, gender, experience etc. of the worker. Therefore, we mainly focus on the demographic determinants of hourly wage rate.

Materials and Methods

Secondary data was used for this study. The required data were extracted from the records of Labor Force and Socioeconomic Survey conducted by the Department of Census and Statistics of Sri Lanka in 2010. Further, the compatibility of the extracted secondary data was also cross-checked with the related labor market environment using the existing literature.

The computer software STATA was used to carry-out data analysis on the secondary data used. Multiple linear regression model was employed to analyze and fitting the data of multiple responses against the dependent variable wage rates. The wage rates were measured on hourly basis and altogether eleven independent variables were incorporated in the model fitting. The proposed model is as follows:

$$Q= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots\ldots\ldots + \beta_{14} X_{14}$$

Where Q= Hourly wage rate (log wage) and the explanatory variables are as follows:

X_1 – Age (β_1)

X_2 – Gender (β_2)

X_3 – Marital status (β_3)

X_4 to X_6 – Ethnic groups (β_4) (β_5) (β_6)

X_7 to X_8 – Institution (government, semi government) (β_7) (β_8)

X_9 to X_{10} – Literacy (English, Sinhala) (β_9)) (β_{10})

X_{11} to X_{14} – Educational level (β_{11})–(β_{14})

Data analysis and Results

In the Labor Force Survey, the whole sample size was 9818 and a sub-sample was extracted for this purpose. The sample is constituted with the people whose ages are between 15 and 65. The data on the demographic and socio economic characteristics: gender, marital status, age, ethnicity, education details, occupation, working hours, salary etc. were extracted from the questionnaires of the survey.

Basic Characteristics of the Sampled Labor Force

In the selected sample, it is observed that there are 74% rural, 16% urban and 10% estate employees. There are 65% male employees while the rest 35% are female employees. When we consider the age groups, the majority represents the age group of 26–35 years. This majority is recorded as 28%. Only 6% of them were aged above 56 years. Considering the level of education in the sample, we see that the highest percentage of employees have followed only pre secondary school education (41%). Only 6% of the employees represent up to tertiary educational category. Further, it is important to see that there are 4% of the employees who have no schooling at all.

The highest percentage, which is 81% of the employees, is literate and this rate is comparatively very high. Further, the sample also shows there are 28% of the employees have never married. The highest percentage of employees is married and it is recorded as 67%. The majority of the employees are Buddhist (75%) while 12% of the Hindu employees are also seen in the sample. According to the nature of the employment 51% of them are the permanent employees. There are 21% of temporary employees and the rest 11% are casual employees.

According to the sample the majority of the employees are engaged in private sector while 21% of them are in government sector.

Considering the ethnicity, the majority of the employees are Sinhala, which is obvious. The employees were categorized in to ten recognized groups according to the Sri Lankan Standard Classification of Occupations, 2011 (SLSCO–11), which was prepared on the basisof updated International Standard Classification of Occupations, 2008 (ISCO– 08). According to this classification we see that there are 4% managers, 3% professionals, 9% technicians, 8% clerks, 7% service and sales workers, 1% skilled worker, 19% craft and related traders, 8%

plant and machine operators and 35% are with elementary occupations.

Econometric specification of data

A multiple linear regression model was used to analyze and verify the relationship among the data. The dependent variable was the "Hourly Wage Rate" and fourteen independent predictor variables were incorporated in the proposed model. This model fitting will be explored under the assumptions of the OLS regression. The following OLS assumptions were adopted in the model specification:

- Existence of Linearity among the variables

- Existence of Normality within the errors of the model

- Homogeneity of variances (Heteroscedasticity issues)

- Independence among the predictor variables (Multicollinearity issues)

- Correct Model specification (Linear / Non-linear issues)

Checking Homoscedasticity of Residuals

One of the main assumptions for the ordinary least squares regression is the homogeneity of variance of the residuals. If the model is well-fitted, there should be no specific pattern to the residuals plotted against the fitted values. The figure 1 given below shows the nature of homoscedasticity inherited in the sample data of this study.
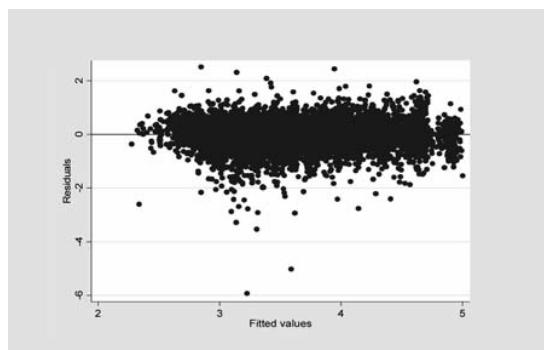

Figure 1:
Plot of Homoscedasticity among residuals

The above plot shows that generally there are no heteroscedasticity among the residuals of the data at different independent variables incorporated in the proposed econometric model. However, specifically it does not explicitly show the heteroscedasticity, this is because of some outliers in the scatter. These outliers only make us suspicion that heterogeneity among the variances whether increasing or decreasing. But, it is not true when the outliers are ignored and hence the homogeneity among the variances, that is, homoscedasicity is confirmed.

Checking for Multicollinearity

An econometric model specified by Classical Normal Linear Regression Model (CNLRM) needs to be verified for multicollinearity because this is an important assumption adopted to apply maximum likelihood procedure (ML) or ordinary least square (OLS) procedure of estimation of parameters. If there are linear relationships between pairs of variables and if the same exist for some other pairs as well then multicolinearity is said to be existed. Such relationships should be checked and if they exist then one of the least important variables of that pair is usually omitted in the model.

We used the **vif** command in STATA in the proposed multiple regression model to check for multicollinearity. The application of this command showed that there are no multicollinearity among the fourteen variables included in the proposed econometric model. It is also important to note that if we consider the realistic meanings of the 14 selected variables along with their statistical characteristics we trivially rule-out such relationships among them pair wise or as a whole.

Model Specification and Significance of the Variables

The assumption of the relationship between the response variable and the predictors is linear has been verified through the above tests. The model specification results are as follows and in Table 1:

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Linktest

RESET test using powers of the fitted values of log-wage

Ho: The model has no omitted variables

$F (3, 9773) = 30.06$, Prob $> F = 0.0000$

Table 1:
Analysis of Variance (ANOVA) on the specification of the model

Source	SS	df	MS	
				Number of obs = 9807
				F(30, 9776) = 420.72
Model	2976.33306	30	99.211102	Prob > F = 0.0000
Residual	2305.31371	9776	.235813596	R-squared = 0.5635
				Adj R-squared = 0.5622
Total	5281.64677	9806	.538613785	Root MSE = .48561

According to the above ANOVA (analysis of variance) table, the p value of the model was recorded as 0.000, which significantly determine that those variables were most suitable to explain the dependent variable. Furthermore, this model is suitable to explain the determinants of hourly wage rate.

Sensitivity of the fitted Model

The econometric model on the basis of the data of "hourly wage rates" against the data from the total of 14 predictor variables was derived using the software STATA is as follows:

$Q = 2.555975 + 0.0010X_1 + 0.29466X_2 - 0.1627874X_3 + 0.03489X_4 - 0.0083X_5 - 0.05315X_6 + 0.2800X_7 + 0.19275X_8 + 0.86625X_9 + 0.2323X_{10} - 0.2081X_{11} - 0.109X_{12} - 0.0506X_{13} - 0.0379X_{14}$

The regression model explains the relationship between the individual earnings and the selected eleven response variables of demographic characteristics of the labor force and their categories. According to the above model with the results of ANOVA, it can be identified that the nature of the relationship is linear and how far each independent variables influences the determination of the hourly wage rate.

The intercept of the model or the constant value 2.556 of the derived model represents the basic effect of hourly wages when all the other variables are under control. Here, all the independent variables are under control means if they do not have effects or take zero values the expected hourly wage rate is 2.556. Thus, the expected or general hourly wage rate in Sri Lanka is 2.556 when we ignore the age, gender, marital status, ethnic group, literacy, education and institution employed.

We also found the following specific observations on the fourteen predictor variables grouped as seven distinct factors against the response variable of hourly wage rate:

The co-efficient 0.001 of X_1 measures the partial derivative of hourly wage rate with respect to age which shows the incremental effect of individual earning per hour with respect to the increase of age by one year of the employees. That is, the percentage change in earnings is given for a percentage changes in age by one year. The second variable X_2 used in the model is a dummy variable. If the person is male, the variable was given a value of 1: if the employee is female, it was given a value of 0. The regression coefficient of this variable is 0.294. This means that the average hourly wage rate difference between male employees and female employees is 0.294. This result reveals that the gender difference in hourly wage rate exist in the labor market in Sri Lanka.

The third variable X_3 is also a dummy variable of marital status. If the person is married, the variable was given a value of 1; if the person is single (never married, widowed, divorced) it was given a value of 0. Here, the regression coefficient 0.1626 is recorded for this variable. This shows that the average hourly wage rate difference between married employees and single persons is 0.162. This result reveals that marital status in Sri Lanka influences the hourly wage rate in labor market.

Considering ethnicity, it mainly categorized in to four as Sinhala, Sri Lankan Tamil, Indian Tamil and others. It is also a dummy variable. If the person is Sinhala, the variable was given a value of 1; if the employee is in other ethnicity like Sri Lankan Tamil, Indian Tamil, Sri Lankan Moor, Malay, Burger and other was given a value of 0. Here the regression

coefficient of this variable is 0.034. This shows that if the employee is a Sinhalese, the average hourly wage difference is 0.034. This shows that the hourly wage rate of Sinhalese is different by 0,034 compared to the other ethnic groups.

If the person is Sri Lankan Tamil, the variable was given a value of 1; if the employee is in other ethnicity like Sinhala, Sri Lankan Tamil, Indian Tamil, Sri Lankan Moor, Malay, Burger and other was given a value of 0. Here the regression coefficient of this variable is 0.008. This shows that the employee who is Indian Tamil, hourly wages decreased but not in a considerable amount compare with the other groups.

If the person is Indian Tamil, the variable was given a value of 1; if the employee is in other ethnicity like Sinhala, Sri Lankan Tamil, Indian Tamil, Sri Lankan Moor, Malay, Burger and other was given a value of 0. Here the regression coefficient of this variable is 0.352. This shows that employee who is Indian Tamil, hourly wage rate difference is 0.352 compared to the other ethnic groups.

Considering the institutions of labor market associated, there are three categories such as government, semi government and private sector. If the person being a government employee the dummy variable X_7 was given 1 and if they belong to private or semi government it was given 0. Here the regression coefficient of this government sector is 0.28. That means that person who worked in government sector, the average hourly wage rate difference is 0.28 compared to the other two types of institutions with labor market.

The next dummy variable X_8 is being defined to semi government workers. If the person being a semi government employee it was given 1 and if they are belong to private and government it was given 0. Here the regression coefficient of this government sector is 0.19. This means that for the persons who worked in government sector, the average hourly wage rate difference is 0.19 compared to the other.

According to the findings the large differences in wage rates that are observed between public and private sector reflect to a large extent differences in educational attainment and experience. Wage offers in the private sector are higher for low education level, but lower for high education levels, quite different from what the OLS results suggest. The OLS results suggest, wage offers in the public sector are not universally higher than in the private sector (Jacques van Der Gaag and Wim vijverberg, 2001).

Literacy is another predictor variable. There are three languages such as Sinhala, Tamil and English observed among the laborers. The languages Sinhala and Tamil are considered separately combining with English as appropriate.

The first dummy variable is defined to be the ability to read and write in Sinhala. If the employee is able to read and write Sinhala the variable is given 1 and if they are able to read and write Tamil or English it was give 0. The regression coefficient is 0.866. This means that if the employee has Sinhala literacy their hourly wage rate difference is 0.866 compared to the employees who have Tamil and English literacy.

The second dummy variable is defined to be the ability to read and write in Tamil. If it is so the variable is given 1 and if they are able in Sinhala or English it was give 0. The regression coefficient was 0.23. This means that if the employee has Tamil literacy their hourly wage rate difference is 0.23 comparing with the employee with Sinhala and English literacy.

The level of education is included in the model as four dummy variables. The educational level of employees was categorized as pre secondary education, post secondary education, tertiary education, and primary education or no schooling.

The first dummy variable is defined for pre secondary educated employee. If the person who is educated up to pre secondary education level, the variable was given a value of 1; if the person who has no schooling or primary or in another category like post secondary etc. it was given 0. The regression coefficient of this variable is -0.208. This means that the person who was educated up to pre secondary level, their hourly wage rate difference with other groups is 0.208

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The second dummy variable is defined for post secondary educated employee. If the person who is educated up to post secondary education level, the variable was given a value of 1; if the person who has no schooling or in another category it was given 0. Then the regression coefficient of this variable is -0.109. That means the person who was educated up to post secondary level, their hourly wage rate difference comparing with the other groups is 0.109.

The third dummy variable is defined for tertiary educated employee. If the person who is educated up to tertiary education level, the variable was given a value of 1; if the person who has no schooling or in another category it was given 0. Then the regression coefficient of this variable is -0.05. This means the person who was educated up to tertiary level, their hourly wage rate difference compared with the other groups is 0.05.

The fourth dummy variable was defined for the employees who have no schooling or have only primary education. If the person who belongs to the level with no schooling or primary education category, the variable was given a value of 1; if the person who has higher level of education such as pre secondary or post secondary or tertiary, the last variable was given 0. The regression coefficient of this variable is -0.0379. This means that for the employees of non-educated or has primary educational level; their average hourly wage rate difference compared to the other three groups of formal education is 0.0379.

The above description clearly reveals that the demographic characteristics of labor force have significant influences on the determination of hourly wage rates of them. In this study we have considered the demographic features of the employees such as age, gender, marital status, educational level, literacy and ethnicity. The type of institution they are employed shows an additional feature which stimulates the social environment of the employees.

Conclusions

The fitted model, the estimated values of the model parameters and the corresponding interpretations of the parameters of the predictor variables relating to the response variable as discussed above reveal to conclude the following:

Age of laborers does not influence significantly on the increase of hourly wage rate in our study of Sri Lankan context. But, it is true that in many societies the age of the laborers determines the higher working hours and influences the wage rates too (Elankumaran, 2003).

Gender is a significant factor determining the hourly wage rate in our study, as a male labor increases the hourly wages and hence more pay compared to a female labor in this study.

The wages of the married employees are higher than the unmarried or single persons in our study. That is, we found that the marital status is an important determinant of hourly wages in Sri Lanka.
Ethnicity is not an important factor to determine the hourly wage rate, as we see no significant changes among different ethnic groups. This is quite common in Sri Lanka because in the postwar scenario, the Sinhalese laborers are engaged in development activities all over the country mixing with Tamil laborers, which reduces the ethnic differences within the labor force.

Comparing the different institutions pay wages, our study shows that the private employees are paid more wages with more working hours, againstgovernment workersand semi government workers.

Considering the literacy of the workers, we found that the employees those who have English literacy earn increasedwages than the employees who have only Sinhala literacy. This is more relevant in the skilled workers of the Sri Lankan labor force.

As a whole, our study reveals that age, gender, civil status, nature of employment etc. have significant influences in determining the wages and working hours. Hence, it is emphasized that the demographic characteristics should be taken into consideration when determining the wages of a particular labor force inherited in the respective areas of the country.

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