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A study on the significant factors for the sector of employment and the salary of science graduands in Sri Lanka

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University education in Sri Lanka is free but extremely limited, competitive and standardized. Because of this competitiveness, it is of paramount importance that Sri Lankan state university graduands are able to secure a career path gauged by the career sector they get employed and by the salary they receive. Graduand employability data, identify that the sector of employment and salary are associated with various factors such as the type of degree, gender, specialization, language proficiency etc. In general, the salary is often related with the sector of employment which gave rise to two correlated response variables. In the presence of two correlated response variables, bivariate modeling/joint modeling is perceived to be more preferable than the use of separate univariate models for identifying the factors associated with each response variable. Therefore, this study was conducted to identify significant factors that are associated with the sector of employment and salary of the science graduands from all Sri Lankan state universities by developing a joint model between the two responses. The graduands employability data collected by the Ministry of Higher Education was used in this study. As the raw data consisted of hundreds of explanatory variables together with the two response variables, a comprehensive descriptive analysis and a univariate analysis was done to identify the most significant factors for the two responses where continuation ratio model was fitted for the ordinal categorical variable "salary" while a multinomial logistic model was fitted for the nominal categorical variable "sector". As two response variables were correlated to each other (Chi-square Val = 271.44, p-value = 0.00) by following the approach of shared parameter modeling, a joint model for "salary" and "sector" was developed by user programming in SAS. By writing down user-specified likelihood functions in SAS PROC NLMIXED for the two response variables significant factors for the two responses were identified as University, Gender, Degree type, Preferred sector, Employment type, Vocational training, Expected salary, Class achieved, Living area, English written ability, Previous employment. It has been observed that joint model has achieved much lower AIC, AICC and BIC than the sum of model fit statistics from univariate models. Therefore, it is noteworthy that the proposed joint model outperformed the separate univariate models in identifying the factors associated with the salary and sector of science graduands.

Keywords: Graduands employability, joint modeling, salary and sector of employment