ABSTRACT

This study aimed to evaluate Sudanese Civil Airlines domestic services for passenger & cargo, statistically estimate their cost function and determine the factors affecting their efficiency. The study endeavours to upgrade civil aviation activities to meet the future requirements for Sudan development. The data were obtained from Sudan Civil Aviation Authority and some currently active Sudanese airlines. They were statistically analyzed to determine the annual cost function of six Sudanese airlines from 2004 to 2013. The researcher was to find out how the total cost (TC) behaves in relation to the domestic output, in revenue passenger (PAX) and freight (FRT), fuel cost (FC) and load factor (LF). The data were analyzed by using the Eviews statistical package to estimate an airline cost function, first; by using the Classical Normal Linear Regression Model (CNLRM), to evaluate the model for forecasting, by satisfying the main features of a good regression model that was represented as follows:

$$TC_t = \beta_0 + \beta_1 PAX_t + \beta_2 FRT_t + \beta_3 LF_t + \beta_4 FC_t + u_t \quad , t = 1, \dots, 10$$

Secondly; by using Panel Regression Models to analyze the data of five Sudanese airlines from 2004 to 2013, for 50 Balanced Long Panel Data observations. The researcher studied the four possibilities of Panel Regression Models: Pooled Ordinary Least Square (OLS) Model, Fixed Effects Least Squares Dummy Variable (LSDV) Model, Fixed Effects Within-Group (WG) Model, and the Random Effects Model (REM). Their results were evaluated to determine the best suitable model to statistically estimate an airline cost function. The models were represented as follows:

$$TC_{it} = \beta_0 + \beta_1 PAX_{it} + \beta_2 FRT_{it} + \beta_3 LF_{it} + \beta_4 FC_{it} + u_{it}$$
$$i = 1, 2, \dots, 5 \quad , \quad t = 1, 2, \dots, 10$$

The researcher concluded that, the (CNLRM) is acceptable to the predictive purpose and forecasting the function of the total cost of each airline, with a high statistically significant value of R-squared (99%), and statistically significant values of F-statistic probability between (0.000-0.00027) at level 5%. Additionally, the residuals were Normally distributed; P-values of Jarque-Bera Normality Test between (0.510203-0.87321) are not st

atistically significant values at 5% level, and not autocorrelation; most of R-squared P-values of Breusch-Godfrey Serial Correlation; LM Test between (0.1463-0.8706) are not statistically significant values at 5% level, but are homoscedastic; R-squared P-values of Breusch-Pagan-Godfrey Heteroscedasticity Test between (0.2755-0.9278); are not statistically significant values at 5% level. The Theil Ineqauality coefficients values between (0.000 505-0.034086) are close to zero and zero Bias Proportions for all airlines in sample research. These results mean that the estimated regression models make sense; with strong power for prediction and forecast. Comparing the results of the Panel Regression Models, he found no difference between (REM) and (OLS), while (LSDV) and (WG) were identical. By applying Wald Test the F-statistic equals 13.26867 with probability value equal to 0.0000, is a high statistical significant value at 5% level. So, we can reject the null hypothesis; all the dummy variables are equal to zero, that are represented in OLS Model, and accept the alternative hypothesis which says that (LSDV) is appropriate. Also, by applying Hausman Test the Chi-square statistic value for 4 degrees of freedom equals 53.0747 with probability value equal to 0.0000, is a high statistical significant value at 5% level. So, we can reject the null hypothesis; the (REM) is appropriate, and accept the alternative hypothesis which says that the (WG) is appropriate. Accordingly, the researcher concluded that the Fixed Effects Models were appropriate to estimate the total cost function of airlines domestic services.