

Labour Mobility

Trend Analysis of Direct Employment in Tourism Industry of Sri Lanka

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INTRODUCTION AND RESEARCH PROBLEM

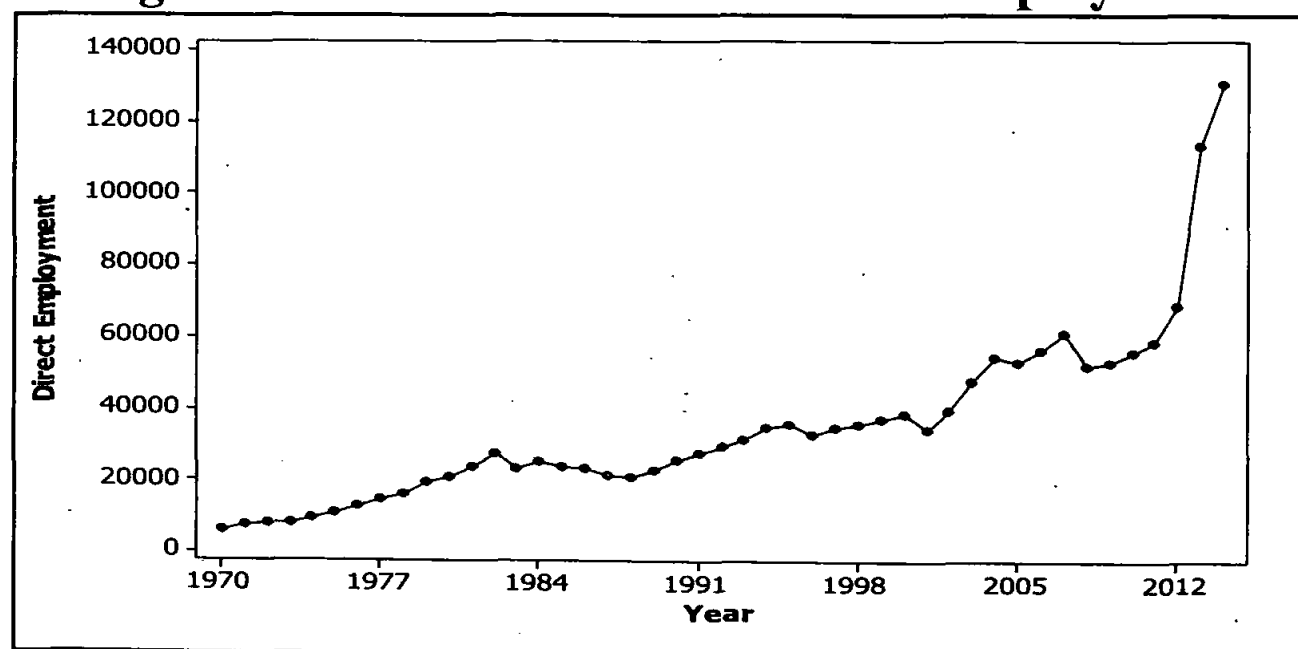
Tourism had begun at the beginning of time. Food, water, safety or acquisition of resources (trade) was the early travel motivations. But the idea of travel for pleasure or exploration soon emerged. The earliest travelers walked or rode domesticated animals. The invention of the wheel and the sail provided new modes of transportation. Each improvement in technology increased individuals' opportunities to travel.

Tourism is a collection of various activities, services and industries that delivers a travel experience, including transportation, accommodations, food, retail shops, entertainment businesses, activity facilities and other hospitality services provided for individuals or groups travelling away from home (Parks and Recreation Management 300, 2003). Tourism is one of the fastest growing industries in the world which provides many economic benefits. Tourism creates millions of jobs, accounting for 1 in 12 worldwide. But in 2014 it was increased from 1 in 11 worldwide. Creating jobs diverse in their level of skill requirement and regional distribution; tourism provides a fast entry point into the workforce for many, particularly for young people and women predominantly in small and medium sized companies (World Tourism Organization, 2011) and (World Travel and Tourism Council, 2014).

Direct and indirect employment opportunities are the major aspects of tourism. Travel and tourism generated 100,894,000 jobs in 2013 as direct employment (3.4% of total employment) (WTTC, 2014). Direct employment includes, employed by hotels, travel agents, airlines and other passenger transportation services, agencies providing recreational facilities, tourist guides, tourist shops and other organizations in the state sector.

Sri Lanka entered international tourism in the year 1960. There were fluctuations of growth in many ways up to 2009. The year 2009 is a significant landmark for the Sri Lankan economy. After 2009, there is a growth in the Sri Lankan tourism industry in many ways (SLTDA, 2013). As a result, direct employment within the industry also shows a remarkable improvement. Figure 1 is the time series plot of direct employment in the tourism industry in Sri Lanka. It clearly shows the improvement of direct employment in over the years. The rapid growth can be seen after the year 2009.

Figure 1: Time Series Plot of Direct Employment



With the increase of direct employment in the Sri Lankan tourism industry, it is essential to have a sound plan for the workforce. Armstrong (2003), defines, employment forecasting as a process of estimating the future numbers of employees required and the likely skills and competencies they will need. Forecasting of direct employment is useful to achieve business objectives, identifying the types and quantities of skills and developing strategies and for many

estimation of current and existing skills (Ward, 1996) and (Parr 2013). This can be achieved, identifying suitable forecasting techniques. It was hard to find, out the literature based on forecasting direct employment in the tourism industry in Sri Lanka. Therefore the objective of the present study was focused on identifying suitable forecasting techniques for direct employment trend of tourism industry in Sri Lanka.

METHODOLOGY

Annual direct employment data from 1970 to 2014 were obtained from annual reports of Sri Lanka Tourism Development Authority (SLTDA). Model fitting was done by utilizing data from 1970 to 2002 and data from 2003 to 2012 utilized for model verification. Box and whisker plot was used for outlier detection in the data set. Box and whisker plot assesses and compares distribution characteristic such as median, range, and symmetry, and detects outliers. Four trend models were tested with log transformation. They are;

$$\text{Linear trend model: } \log Y_t = \alpha + \beta_1 t + \varepsilon \text{ -----(1)}$$

$$\text{Quadratic trend model: } \log Y_t = \alpha + \beta_1 t + \beta_2 t^2 + \varepsilon \text{ -----(2)}$$

$$\text{Growth curve model: } \log Y_t = \alpha(\beta^t) + \varepsilon \text{ -----(3)}$$

$$\text{Pearl – Reed Logistic model: } \log Y_t = \frac{A}{\alpha + \beta(\gamma^t)} + \varepsilon \text{ -----(4)}$$

Residual plots and Anderson-Darling tests for residuals were used as a model validation criterion. Forecasting ability of the models was assessed by considering Mean Absolute Percentage Error (MAPE), Mean Square Error (MSE) and Mean Absolute Deviation (MAD). Three measurements of errors used are as follows:

$$MAPE = \frac{1}{n} \sum \left| \left(\frac{Y_t - F_t}{Y_t} \right) \cdot 100 \right| \text{-----(5)}$$

$$MAD = \frac{1}{n} \sum | (Y_t - F_t) | \text{-----(6)}$$

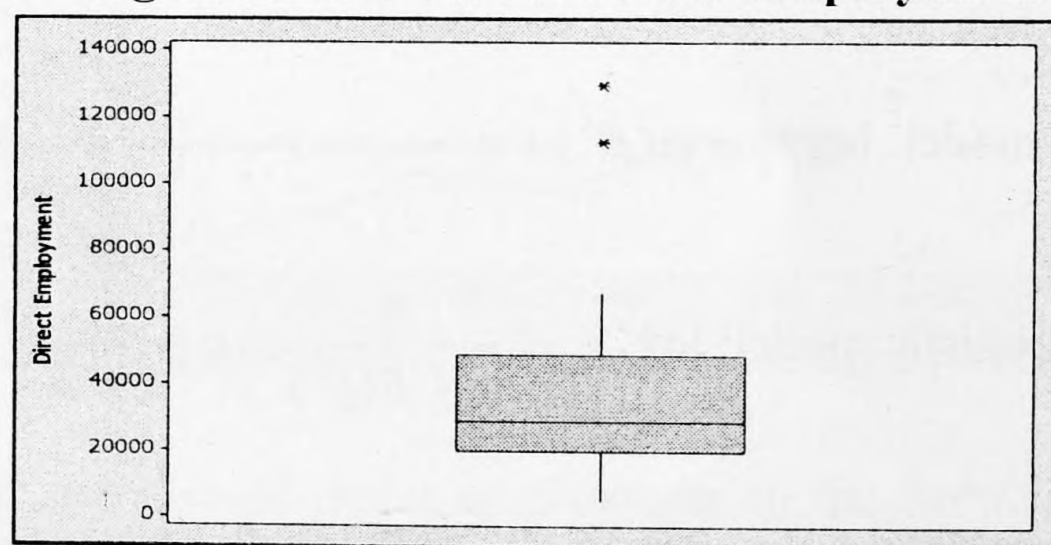
$$MSE = \frac{1}{n} \sum (Y_t - F_t)^2 \text{-----(7)}$$

Where; Y_t = Observed value of time t, F_t = Forecasted value of time t

RESULTS AND FINDINGS

Analysis begins with the checking of outliers. They are the extremely large or small values in a data set. Box and whisker plot, given in Figure 2 has obtained to check the outliers of the data set. It can be clearly seen that the data set contains 2 outliers. The year 2013 and 2014 are the outliers of direct employment and those are extreme values. Mean and standard deviation of a data set is badly affected by the outliers. Therefore, when following parametric statistical methods in a data analysis, it is a must to make the data set outlier free. Hence, outliers were removed before further analysis.

Figure 2: Box Plot of Direct Employment



Then models (1), (2), (3) and (4) were tested on the data set and summary of model fitting and verification is given in Table 01.

Table 1: Model Summary

Model	Model Fitting		Model Verification	
$\log Y_t = 3.90106 + 0.0236193t$	MAPE	1.83879	MAPE	1.97196
	MAD	0.07738	MAD	0.0935094
	MSE	0.00955	MSE	0.0112468
	Normality	P = 0.825		
$\log Y_t = 3.71714 + 0.0551484t - 0.000927325t^2$	MAPE	1.14898	MAPE	6.30431
	MAD	0.04924	MAD	0.299522
	MSE	0.00391	MSE	0.0972585
	Normality	P = 0.988		
$\log Y_t = 3.90479(1.00562^t)$	MAPE	1.93115	MAPE	2.80418
	MAD	0.08150	MAD	0.133022
	MSE	0.01041	MSE	0.0211438
	Normality	P = 0.894		
$\log Y_t = \frac{10^2}{12.3209 + 1.43726(0.962806^t)}$	MAPE	1.14131	MAPE	2.89155
	MAD	0.04906	MAD	0.137362
	MSE	0.00442	MSE	0.0200962
	Normality	P = 0.272		

P-values of the Anderson-Darling test of all the fitted models were greater than the significance level (0.05). They confirmed the normality of residuals. The residual plots confirmed the independence of residuals of all models. According to the results in Table 01, except the quadratic trend model, all the other models have MAPE's smaller than 5% in both models fitting and forecasting. However, linear trend model has least MAPE's among them. The values were 1.83% and 1.97 % respectively. MAD and MSE also confirmed the smallest deviation in linear trend model compared with other trend models.

Actual Vs fits of the Linear trend model, Quadratic trend model, Growth curve model and Pearl – Reed Logistic (S-Curve) model are shown in Figure 3, Figure 4, Figure 5 and Figure 6 respectively. The plots obtain for the period: 1970 to 2002.

Figure 3: Actual Vs Fits of Linear Trend Model

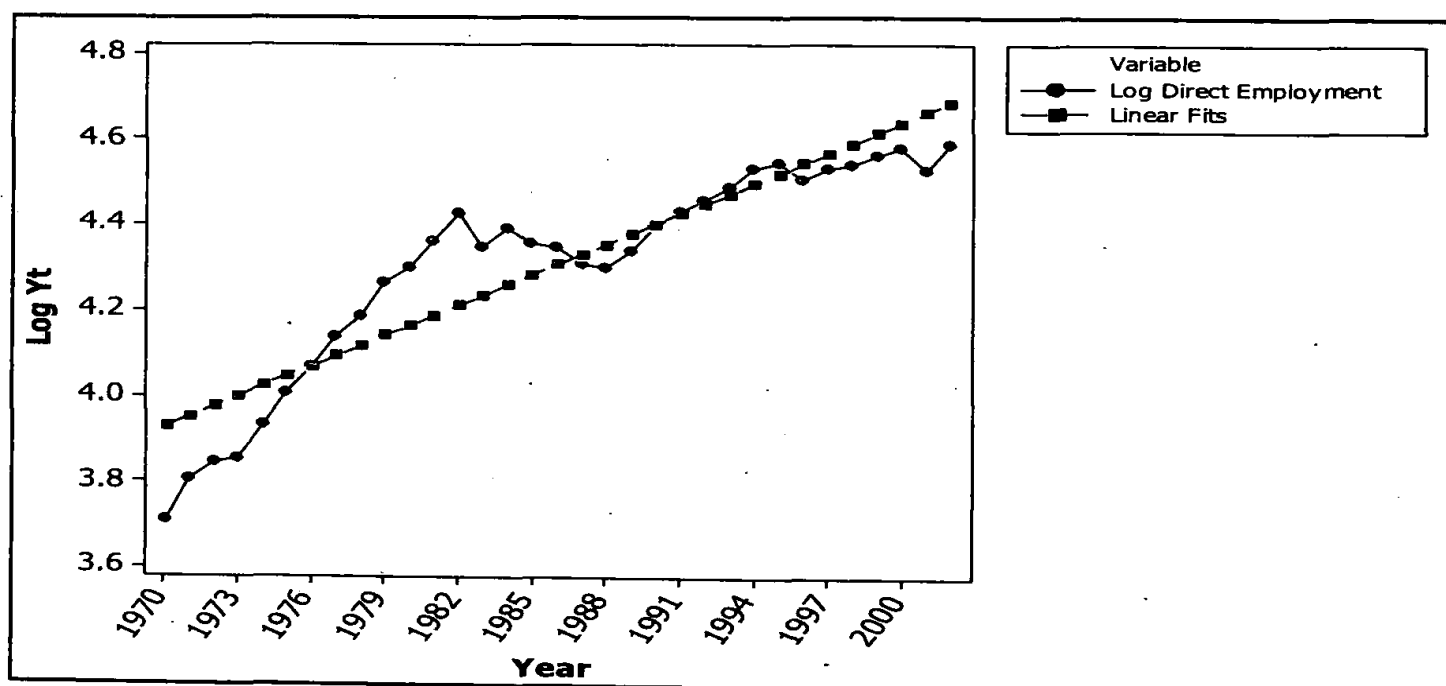


Figure 4: Actual Vs Fits of Quadratic Model

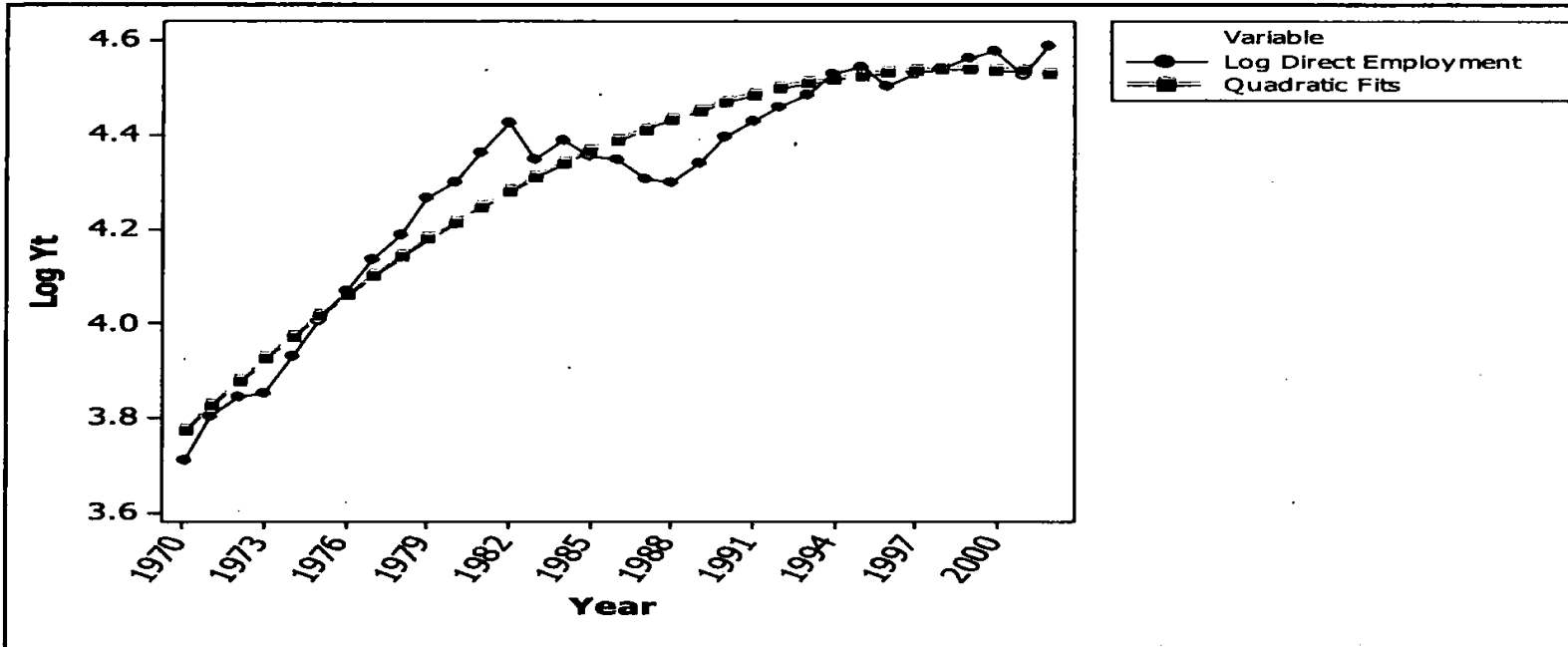


Figure 5: Actual Vs Fits of Growth Curve Model

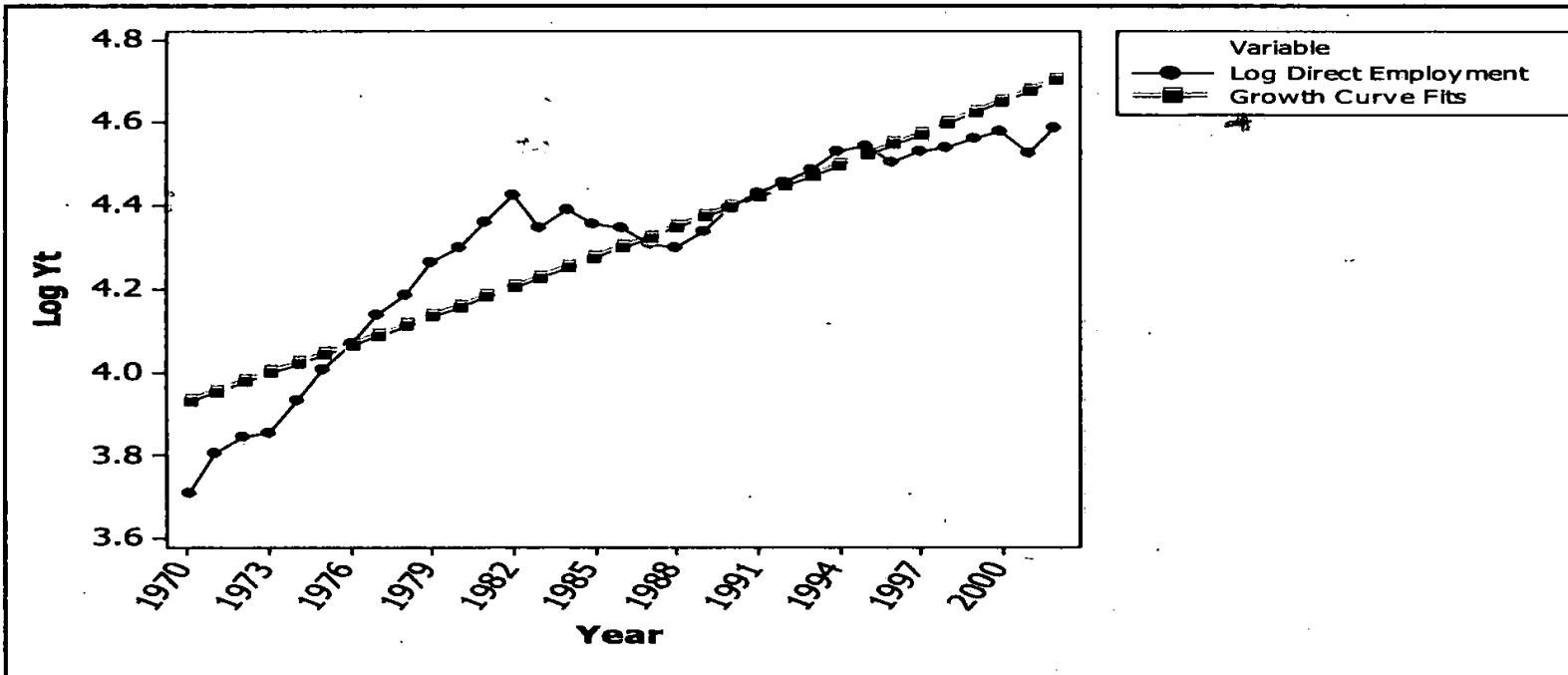
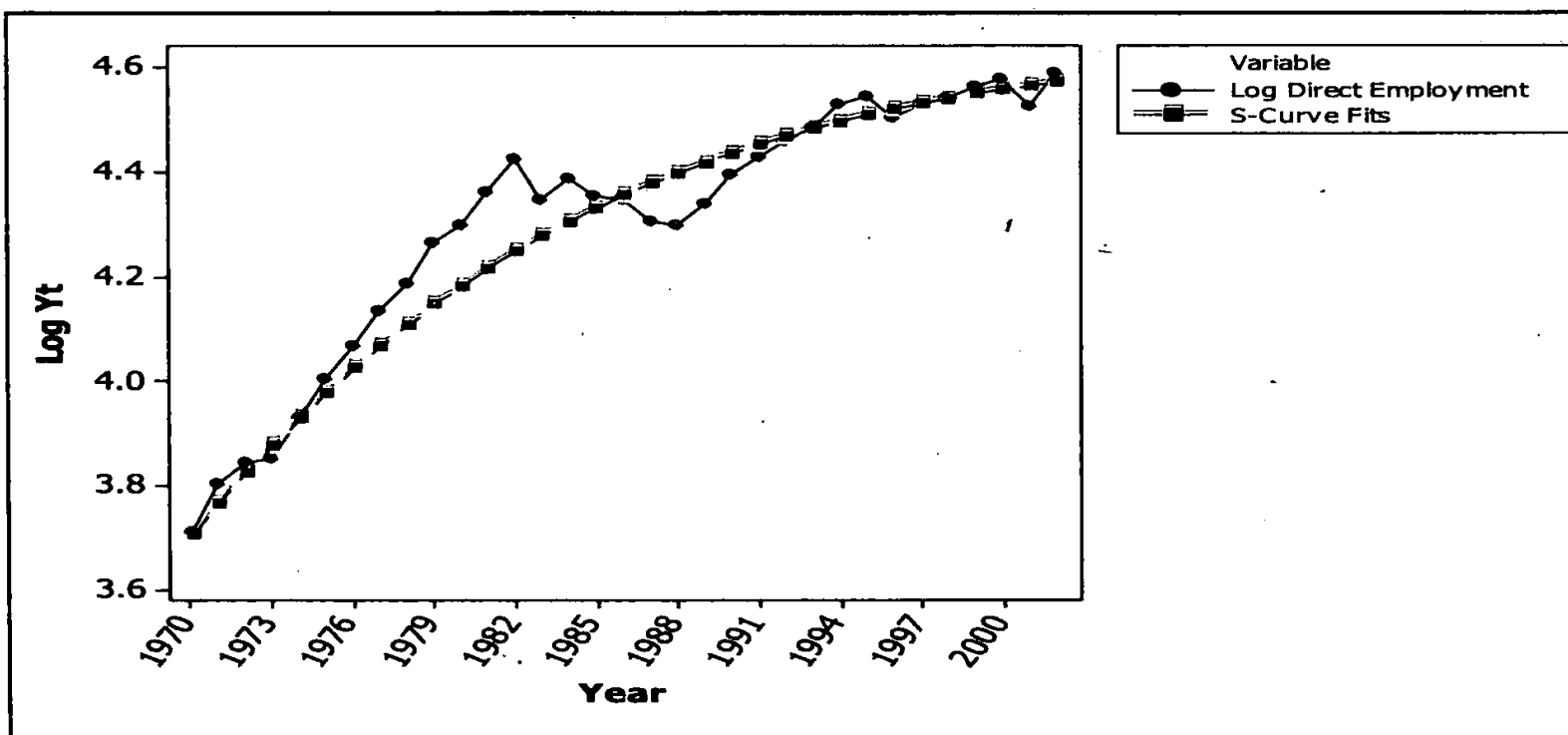
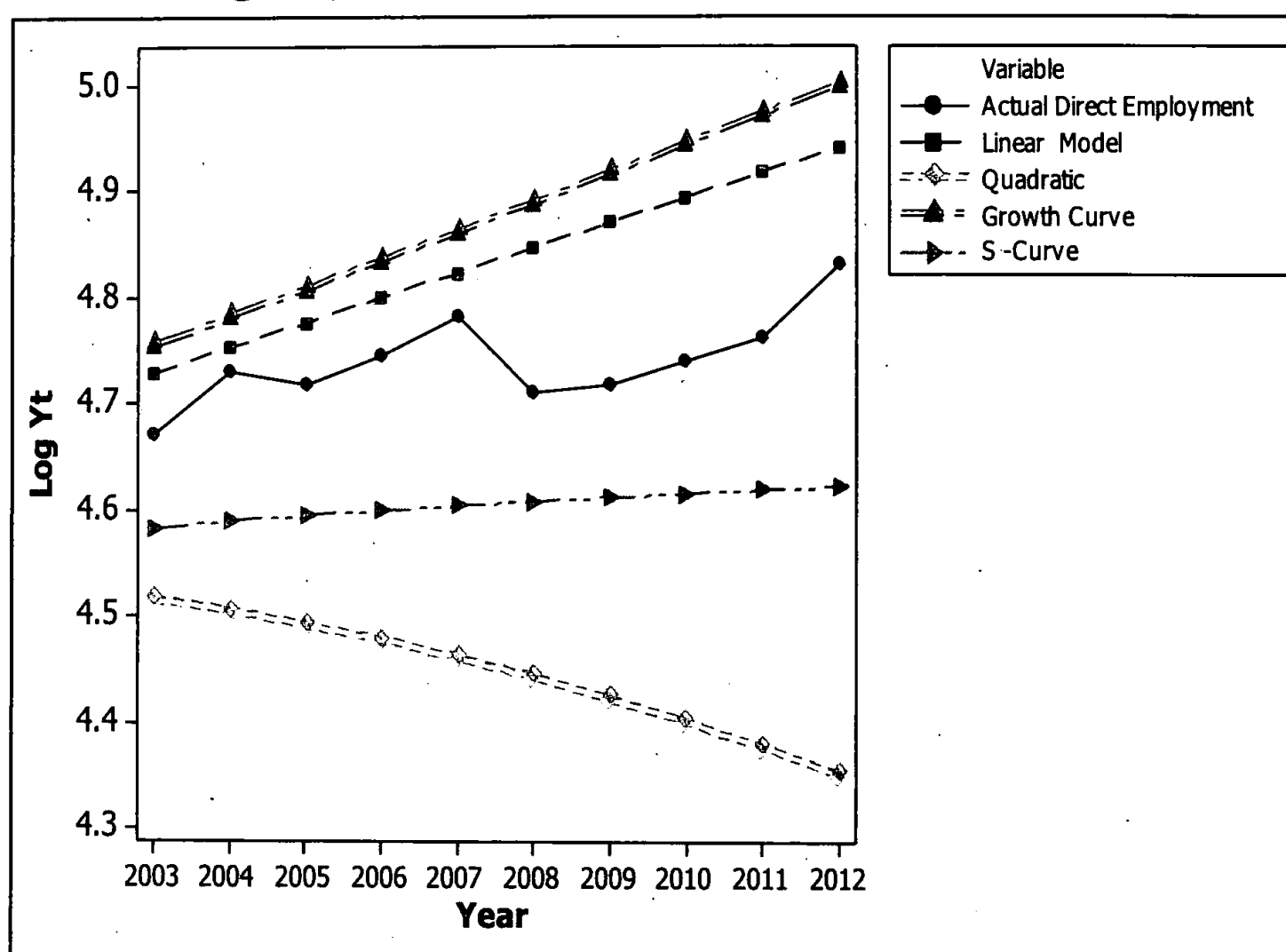


Figure 6: Actual Vs Fits of Pearl Reed Logistic Model



Forecasting direct employment for the period: 2003 to 2012 was done by all four models and were plotted with actual direct employment for the aforesaid period (Figure 7). According to Figure 7, Growth curve model overestimates the direct employment, Quadratic trend model and S-curve (Pearl- Reed logistic) models underestimate direct employment. Also, it is clear that the forecasts of linear model are very close to actual direct employment.

Figure 7: Comparison of Forecasted Values



CONCLUSIONS, IMPLICATIONS AND SIGNIFICANCE

Linear trend model fulfilled all model validation criteria in both model fitting and forecasting. In general, if MAPE of a model is less than 5%, that model is considered as a suitable model for forecasting. A Linear trend model of this study has 1.97 % of MAPE. Therefore, Linear Trend Model with log transformation is highly suitable for forecasting direct employment of tourism industry in Sri Lanka.

The results of this study can be used to forecast direct employment in the tourism industry of Sri Lanka to reduce the surplus of employees who are not being fully and effectively deployed. It will reduce the performance incapability and improve profitability within the industry. Also findings of the study are useful for sustainability of the tourism industry in Sri Lanka and can be used as a lighthouse for various decisions such as recruitments, training and developments and other expansions of a business.

Future research is recommended in the forecasting indirect and total employment opportunities of the tourism industry in Sri Lanka.

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