# MODELING FOR TOURISM THROUGH ECONOMIC INDICATORS OF PAKISTAN

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## ABSTRACT

*The purpose of this study is to find an appropriate model for tourism data of Pakistan. Log tourism has been used as a dependent variable while Financial Exchange Rate, Gross Domestic Product, Employment, Visitor Exports and Investment are taken as independent variables. Data has been collected from secondary source Tourism Department of Pakistan and Economic survey of Pakistan 2014, for the period of 2004-2014.   For final model selection, the model selection techniques; all possible regression, forward selection procedure and backward elimination procedure have been used. The final selected model can be used for future prediction of tourism. According to our findings two independent variables; employment and GDP significantly contribute to tourism. This model can be used for short run predication, because our data consist of very few years, which is the main hurdle that this model cannot be applied for long run prediction.*

**Keywords:** Tourism,  all  possible  regression,  forward  selection  and  backward selection.

## INTRODUCTION

Since the beginning of recorded history, humans are driven to travel for the purpose of business (trade), exploration, food, water and safety. In the intervening time, the purpose of trading has increased to entertainment and delight. Traveling also increased due to advanced technologies, which facilitate the people to move easily from one place to another. In the past, travelers used to walk or ride on tamed animals. With the advancement in different field specifically, the invention of the wheel, planes and sea ships provided new mode of traveling. There is always a gradual increase with advancement, like chain of roads increased, governments stabilized and interest in traveling increased for sightseeing, education and religious purposes.

Tourism not only provides the inner pleasure to the tourists but also gives strength to the nation. The impact of tourism has many positive effects on the economy like, increased employment ratio, better currency exchange rate, diverse education, cultural exchange and improving hoteling etc. According to UNWTO World Tourism in 2009 the number of world tourist is 880 million, whereas, it is estimated that it to be1.6 billion by 2020. In the last few decades, the tourism industry in Pakistan was badly affected due to unstable condition of Pakistan (Getz, 2009; Wall & Mathieson, 2006). Tourism and economic growth has long history. There are too many consequences of economic growth on tourism, and there are many developed techniques in order to estimate the economic

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impact on tourism (Andersson, Armbrecht, & Lundberg, 2008).

In Asia, tourism is considered to be more important factor for economic growth. Through tourism, increased employment, per capita income, foreign exchange rate, trade in commodities is obvious. This foreseen high economic growth attracts the tourist for business tours and exchange programs. Tourism is an important sector for authorities, consultants and tourism developers for measuring the economic developments and its impact on tourism.

Generally, tourism is an assortment of industry, services and activities that distributes travel experience. According to the World Tourism Organization (WTO) presently tourism is the largest industry in the world, with annual revenues of over $3 trillion and it also provides more than 6 million jobs only in US. This industry contributes more than 10% in the world GDP, also this is the source for the income of generation, job developments and so many other advantages can be obtained for a state. According to the world tourism organisation, global incomes from tourism in 2002 were high up to $ 474 billion which is likely to increase 1.5 trillion by 2011 (WTTC, 2010).

Unfortunately, due to political instability, war in terror, floods, bomb attacks or suicide attacks, tourism is neglected in Pakistan and the most beautiful valleys are affected in the war of terrorism. Recently created Pakistan has recovered all the deficiencies. The elevation of tourism in the country stared in the 1960 in the shape of a small department of tourism which was created in 1960 as a cell in the Ministry of Railway. And afterward the Department of Tourism was transferred from one Minister to another. Now the Tourism in Pakistan department has gained the status of tourism Department under the Ministry of Tourism (Khan et al. 2011).

### *Objectives of the study:*
The main objectives of the present study is to investigate the best model for tourism in Pakistan selection through model selection criterion, as well as to find the best sub set of predictors and identified that the final model can be used for prediction or not.

## LITERATURE REVIEWS
Several researchers have discussed the importance of tourism industry and its contribution in economic growth all over the world, impact on cultural, social, environmental growth (Deery & Jago, 2010; Dogan, 1989; Gösslingt & Hall, 2008; Lankford & Howard, 1994; Pizam, 1978; Turner & Ash, 1975). According to Kulendran and Wilson (2002) are studied the empirical analysis of China and Australia, they observed form their study a strong relationship between international tourism and economic growth. Further they concluded that through international and domestic tourist not only caused increase economic growth but this also increased the opportunity of employment and trade etc.

Similarly, the excellence in economic growth attracts people for business tours and they openly invest money in the developed industry as a result labor force and employment also might be increased (Bahmani- Oskooee & Alse, 1993; Chow, 1987; Marin, 1992). According to UN World Tourism Barometer (2009) total 924 million visitors were seen worldwide by the end of 2008 which was 2% high compared to 2007. This results show that the number of visitor's increases year by year but now in the present conditions

people liked travelling more and this ratio is expected very high in the recent years.

Nissan et al (2010) discussed those determinants which affecting the tourism sector. Also found the feedback between income and tourism. The finding of the study suggest that tourism not only create money for financial firms but also motivates local firms and creates new jobs opportunities that increase the labor force. Variables that have important effects on tourism sector like entrepreneurship and prices of different commodities. Results suggest that tourism has a positive impact on economic growth, entrepreneurship, price and income.

Lord & Brain (2009) in their study focused to evaluate those opportunity which promote the high tourism culture with respect to visitor perspective. The recommendation in that study suggests that high quality, distinctiveness and infrastructure are the major benefits to maximizing the tourism industry.

Sequeria & Nunes (2010) focused on the tourism specialized countries. They described in their study the economic growth of these countries are high than those countries who are not focused on tourism. In the proposed study researcher used panel data for studying the relationship among economic growth and tourism. Further they conclude that tourism has positive effect on economic growth but tourism contribution is least in small and poor countries because they have insufficient opportunities to develop this industry.

Po & Huang (2008) they used cross sectional data for 88 countries over the year 1995 to 2005. They used nonlinear regression between tourism sector and economic growth. Analysis indicates that data for these countries should be distributed into different groups according to their geographical condition. Further they conclude that tourism has positive significant effect on economic growth.
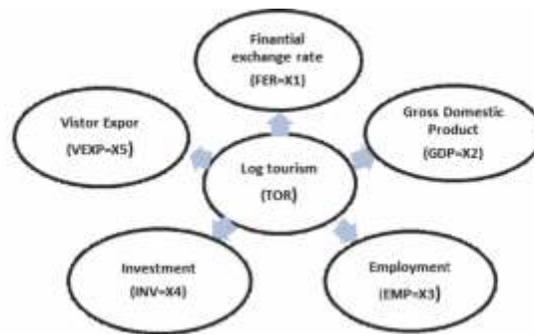


Figure 1: Theoretical Framework

**HYPOTHESES**

**H1:** Financial exchange rate has significant impact on log tourism

**H2:** Gross Domestic Product has significant impact on log tourism

**H3:** Employment has significant impact on log tourism

**H4:** Investment has significant impact on log tourism

**H5:** Visitor export has significant impact on log tourism

## MATERIALS AND METHODS

In the present study, annual data has been used from 2004 to 2014 which has been collected from the secondary source like, Tourism department of Pakistan and Economic survey of Pakistan-2014. Log tourism (LnTUR) used as response / dependent variable and five independent variables financial exchange rate (FER), gross domestic product (GDP), employment (EMP), visitor export (VEXP) and investment (INV) have been included.

Augmented Dickey Fuller (ADF) test has been used for testing the stationarity of the variables; all the original variables are stationary at level. The test for stationarity is important for long term relation and for prediction purpose. Furthermore all possible regression, forward selection procedure and backward elimination criteria were used for model selection on the basis of R-Square, Adjusted R- Square and Mean Square Error (MSE). Data has been analyzed in Statistical Software for Social Sciences (SPSS).

### *Analysis and Discussion:*

According to the objectives of present study researchers use various statistical tools to carry out their analysis. In the present study we used three different statistical tools, to identify best model out of all possible regression models and also to find the best sub set of predictors. For this purpose, we used all possible regression, backward elimination and forward selection procedures.

### *All Possible Regression:*

All possible regression means to identify the best sub-set of predictor's regression model out of all possible regression models. In the present study used five explanatory variables which established $2^5-1=31$ models. For best model selection criterion were used such as coefficient of determination (R-Square), Adjusted R-Square and Mean square Error (MSE). In Table-1 have been used five single variable regression models in which just only one regression model with (X3) independent variable have been selected, having R-square is 76.2% indicates that 76.2% of the variability explained in dependent variable by its linear relationship with the independent variable (X3) and remaining is unexplained due to other factors. Also in this model Adjusted R-square value is maximum 73.5% and the mean square error is too minimum out of all single variable models.

Now for the two independent variables we have ten possible regression models in which (X2,X3) have been selected having R-square value is 84.4%, indicates that 84.4% of the variability in dependent variable explained by its linear relationship with the independent variable (X2,X3) and remaining due to other factors, this also indicates that (X2) is an important variables. The value of Adj R-square 80.5% is also increased as compared to single variable model. Further if we observed the value of mean square error remain same as single variable model. Now for the three independent variable we have also ten models in which (X2,X3,X4) have been selected, having high R-square 88.7%, indicates that 88.7% of the variability in dependent variable explained by its linear relationship with the independent variable (X2,X3,X4) and remaining is unexplained due to other factors. Also the value of Adj R-Square value 81.2% increased as compared to two variable model, indicate that (X4) has significant effect on

dependent variable when appear with (X2,X3), further the value of MSE has to decreased as compared to previous model, so three variable model is most suitable as compared to previous models.

In four independent variables we have five regression models in which (X1,X2,X3,X4) have been selected, having high R-square 89.1%, indicates that 89.1% of the variability explained in dependent variable due to its linear relationship with the independent variable (X1,X2,X3,X4) and remaining due to other factors. The value of Adj R-square 81.9% were decreased as compared to three variable model by adding fourth variable (X1), but the MSE remain the same like the previous model.

In full model in which all independent variables are included (X1,X2,X3,X4,X5) its R-square values is not much different than four variable model. But if we observed that there is no major difference between three and four variable selected model, but in this case the most appropriate model is two variable models because the R-square value is higher than 80% and the second advantage is it deal easily as compare to larger models. At the end from the whole analysis conclude that among these 31 models only the two variables model (X2, X3) is important model and more appropriate and used for predication and other necessary calculation. In simple word we can say that the most appropriate model is log-linear regression

$$LnY = \beta_0 + \beta_1 X_3 + \beta_2 X_2$$

So, this model shows that gross domestic product (X2) and employment (X3) have more contribution in tourism; more simply tourism is highly effect through these two variables. Now we will check the model selection and the best sub set of independent variables by another criterion known as backward and forward selection criterion. The analysis for these two criterions follows as:

Table-1: Model Selection and Selection of Significant Variables by Coefficient of Determination, Adj R-square and Mean square error Criteria.

| Best Model | predictors in model | R-Sq | Adj R-Sq | MSE | Best subset model |
|---|---|---|---|---|---|
| Model-1 | X3 | 0.762 | 0.735 | 0.002 | $LnY = \beta_0 + \beta_1 X_3$ |
| Model-2 | X2,X3 | 0.844 | 0.805 | 0.002 | $LnY = \beta_0 + \beta_1 X_2 + \beta_2 X_3$ |
| Model-3 | X2,X3,X4 | 0.887 | 0.812 | 0.001 | $LnY = \beta_0 + \beta_1 X_2 + \beta_2 X_3 + \beta_3 X_4$ |
| Model-4 | X1,X2,X3,X4 | 0.891 | 0.819 | 0.001 | $LnY = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$ |

### Backward Selection Criterion:

This selection criterion, starts from the full model and then one by one variable is removed from the model. The process of eliminating the variable from the model will be continuing until the best model and the sub set of best predictors are achieved. In this procedure we start from the full model removed all those variables which are insignificant, the process will be continued until we get the significant variables.

Now, observed model summary Table-2 in the model (1) the value of R-square is maximum, but we dropped one by one independent variables the value of R-square will

be decreased. If one can compared the value of R-square of model (1) and model (4) there is no major difference among these two models clearly shows the values which are 0.892 and 0.844 respectively. In the last model (4) we included two variables which are (X2, X3) and the R-square value also greater than 80%.Another side, if we compared Adj R-square values, for the first model is too minimum among all four models. This indicates that in the full model some insignificant variables are present by which the Adj R-square is smaller. But in the last model the value of Adj R-square is high compared to the first model and the standard error also minimum. So again according to this criterion two variable models is best one.

Table-2: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .94 | .892 | .784 | .040945 |
| 2 | .94 | .891 | .819 | .037492 |
| 3 | .94 | .887 | .838 | .035397 |
| 4 | .91 | .844 | .805 | .038891 |

Table-3: ANOVA

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | .065 | 2 | .033 | 21.642 | .001 |
| Residual | .012 | 8 | .002 | | |
| Total | .078 | 10 | | | |

Table-4: Coefficients

| Model | Unstandardized Coefficients | | Standard Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 11.99 | .260 | | 45.78 | .000 |
| X2 | -.001 | .0004 | -.425 | -2.27 | .044 |
| X3 | .001 | .0007 | 1.186 | 5.733 | .000 |

In Table-3 clearly observed the residual sum of squares, which is least in the suggested model, is 0.012, and the value of F-statistic is 21.642, shows that the overall model is highly significant. This criterion also suggests the two variable model when we removed variables from the model the performance of the model also increased. In the (Table -4), only discussed the finalized model coefficients and the significance of variables. In first stage we added all explanatory variables and then one by one

insignificant variables will be eliminated until the significant variables were left. At the end two variables are left in the model, which is our final model, X2 has negative significant and X3 has positive significant impact on dependent variable.

**Forward Selection Criterion**
This criterion is the reciprocal of backward selection criterion, in this criterion, we taking start from constant with no predictors at the first stage, and the second stage we added one highly significant variable in the model, in this way we obtained one best variable in the model. In the second stage we obtained the second significant variable. The process will continue until all insignificant variables are left. In Table-5 R-square, with X3 alone (step 1), 76.2% of the variance was accounted for both X3 and X2 (step 2), 84.4% of the variance was accounted for.

Table-5: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | 873[a] | .762 | .735 | .045308 |
| 2 | .919[b] | .844 | .805 | .038891 |

Table-6: ANOVA

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| | Regression | .059 | 1 | .059 | 28.785 | .000* |
| | Residual | .018 | 9 | .002 | | |
| | Total | .078 | 10 | | | |
| 2 | Regression | .065 | 2 | .033 | 21.642 | .001b |
| | Residual | .012 | 8 | .002 | | |
| | Total | .078 | 10 | | | |

Table-7: Coefficients

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std.error | Beta | | |
| 1 | Constant | 12.089 | .287 | | 42.051 | .000 |
| | X3 | .001 | .000 | .873 | 5.365 | .000 |
| 2 | Constant | 11.919 | .260 | | 45.784 | .000 |
| | X3 | .001 | .00017 | 1.186 | 5.733 | .000 |
| | X2 | -.001 | .00044 | -.425 | -2.273 | .044 |

This Table-7 now gives two F-test one for each step of the procedure. Both steps had overall significant results. Table-8 gives beta coefficients so that we can construct the regression equation. Betas shows change, in dependent variable, depending on which predictors are included in the model. These are the weights that we want, , for an

an equation that includes just X3 and X2 (the two best predictors). The equation would be;

$$LnTUR = 11.919 - 0.001(EMP) + 0.001(GDP)$$

All the three different selection procedure gives the same results. So we can conclude from the whole analysis the two variable model "employment" and "gross domestic product" is the best one. These two variables can be used to predict the tourism.

***Results for Research Hypothesis:***

| Alternative hypothesis | Accepted | Rejected |
|---|---|---|
| H1 | × | ✓ |
| H2 | ✓ | × |
| H3 | ✓ | × |
| H4 | × | ✓ |
| H5 | × | ✓ |

According to selected model, our first alternative is rejected, because financial exchange rate has no significant effect on tourism. The second alternative hypothesis is accepted GDP has negative significant effect on tourism. Third alternative hypothesis also accepted employment has positive significant effect on tourism and the fourth and fifth hypothesis has been rejected.

## CONCLUSION

In present study, we used log tourism as dependent variable financial exchange rate, gross domestic product, employment, visitor exports and investment as independent variables. Ten year data has been used, collected from the secondary source,

Three different statistical tools were applied for data analysis, all possible regression, backward elimination and forward selection procedures, to achieve the objectives and research hypothesis. From three different results we obtained the same results. In all possible regression, total number of possible regression equations are 32, in which one is constant model with no predictors, five are one variables models, ten are with two variables models, ten are with three variables models, five are four variables models and the last model is full variable model mean with five predictors.

This method suggest us two variable model is more efficient out of all models, which has maximum R-square, Adj R-squared and minimum MSE, named of these two variables are employment (X3) and gross domestic product (X2). Backward elimination and forward selection procedure also suggest discussed model. According to selected model, our first alternative is rejected, because financial exchange rate has no significant effect on tourism. The second alternative hypothesis is accepted GDP has negative significant effect on tourism. Third alternative hypothesis also accepted employment has positive significant effect on tourism and the fourth and fifth hypothesis also rejected.

The finalized model can be used for short run predication, because our data consist of very few years, which are the main cause this model cannot be used for long run prediction.

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