Firm The Right Tyres for The Vehicles: An Application of Multiple Regression

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Abstract- Regression analysis having a single exogenous variable is called simple regression analysis. However, regression analysis having more than one exogenous variable is called multiple regression. The primary difference between the two is the complexities of estimating the model. In multiple regression, mutual covariance among the exogenous variables also plays its part. An additional assumption of multicollinearity needs to be addressed in multiple regression. Suppose the association between the two exogenous variable is high and significant. In that case, one of the best remedies is to remove one of the exogenous variables having a high correlation while maintaining the other model parameters intact.

Indexed Terms- Simple Regression; Multiple Regression; OLS; ML; GMM.

I. INTRODUCTION

The Tyre Rack, America's leading online distributor of tires and wheels, conducts extensive testing to provide customers with products that are right for their vehicles, driving style, and driving conditions. In addition, the Tyre Rack maintains an independent consumer survey to help drivers help each other by sharing their long-term tyre experiences. The following data show survey ratings (1 to 10 scale with 10 the highest rating) for maximum performance summer tyres. The variable Steering Rates (sr) measures the tyre's steering responsiveness, Tread Wear (tw) rates the quickness of wear based on the driver's expectations, and Buy Again (ba) rates the driver's overall tyre satisfaction and desire to purchase the exact tyre again.

II. LITERATURE REVIEW

Multiple regression analysis is an extension of simple regression analysis [13]-[29]-[34]-[35]-[3]-[4]-[5]. Estimation of the coefficient is done using a method known as OLS (Optimum Least Square) method. The other popular methods to estimate coefficients are known as maximum likelihood and GMM (Generalised Method of Moments). In addition, a combination of two regression equations is measured to measure the volatility (GARCH Family of models). One equation is for the mean, and the other equation is for conditional variance [31]-[15]-[17]-[20]-[21]-[22]-[23]-[25]-[27]-[38]-[34]. The same situation, though in a little advanced form, is seen in the estimation of bivariate GARCH models as well [16]-[18]-[24]-[26]-[11]-[6]-[7]-[8]-[9].

However, the regression methods in the panel data are different as they need to address more inherent issues in the panel data. Before the application of the regression, they need to explore the nature of the effect (fixed effect or random effect) [29]-[31]-[1]-[2]-[10]-[13]-[12]-[14]-[15]-[32]-[33].

III. ISSUES TO BE SOLVED

a) Build a model to predict the Buy Rating using.
  i. Only steering rating.
  ii. Steering rating and tread wear.
b) Predict the buy rating if, steering rating of a tyre is 6.2 and Tread Wear rating is also 6.2. Calculate the range also.
c) Between steering rates and tread wear, which is more important explanatory variable for buy again decision of a customer.
d) On the basis of result, in case of capital rationing, where more money should be invested by Tyre Rack to have more Buy Again decision. Describe your answer on the basis of results of points 1-3.

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