# Group Exercise

JK Tires is interested in measuring consumers' trade-offs among the following attributes of a tire: Brand (JK, Goodyear, and Michelin), Miles (30K, 40K, and 50K), Price ($50, $60, and $70), and Sidewall (White and Black). A group of 400 retail customers and a group of 50 business customers were asked to rate a set of product profiles on a 10-point scale (conjoint analysis) and their ratings were used to construct customer utility equations for both retail and business customers: (note: price was coded as a dummy variable). Following are the mathematical approximation of there decision process in the tyre category.

Utility Equation for Retail Customer (**70% of the Total Market**)
U  =  0.1+2.0×JK+3.0×Goodyear      [Brand] ( hint: beta coefficient for Michelin is zero)
       +2.0×40K+3.0×50K                 [Miles]
       +2.0×$50+1.0×$60                 [Price] ( hint: similarly beta coeff. for $70 is zero)
       +0.5×White                          [Color]

Utility Equation for Business Customer (**30% of the Total Market**)
U  =  0.1+0.5×JK+0.8×Goodyear      [Brand]
       +2.5×40K+5.0×50K                 [Miles]
       +3.0×$50+1.5×$60                 [Price]
       +0.1×White                          [Color]

*What it means is that for a retail customer's utility of Goodyear black walled tyre with 40K miles at $60 is 0.1+3+2+1+0=6.1  and the utility of Michelin black tyre with 30K miles at $70 is 0.1*
*These utilities can be converted in to purchase probabilities / market shares using appropriate choice rule. Utilities themselves are ordinal variable like (temperature). In other words, the values itself may not have any meaning, multiplying or adding a same constant to all utilities (affine transformation) do not change its nformation content. .*

a)  Which brand has the highest brand equity in the retail market?

b1) What is most impotant attribute for retail market?

b2)  Which customer segment is more price-sensitive?

Suppose the market share of a product in the retail market can be predicted by the following equation: (note: retail market is 70% of the total market)

$$MS_i = \frac{\exp(U_i)}{\sum_j \exp(U_j)}$$ . Where exp denotes exponent function e.g. exp(0)=1 and Σ denaotes the

summation. What it means is that for example if you have 3 products in the market A, B, and C

then the market share of A would be $\dfrac{\exp(U_A)}{\exp(U_A)+\exp(U_B)+\exp(U_C)}$

Similarly assume the market share of a product in the business market can be predicted by the following equation:  (note: business market is 30% of the total market)

$$MS_i = \frac{\left(U_i\right)^2}{\sum\limits_j \left(U_j\right)^2}$$

c) If the products available in the market are (JK, 30K, $40, Black), (Goodyear, 40K, $60, White), and (Michelin, 50K, $50, Black), which brand is likely to have the highest market share in the retail market? (Hint: extrapolate coeff for $40)

d) If the products available in the market are (JK, 30K, $40, Black), (Goodyear, 40K, $60, White), and (Michelin, 50K, $50, Black) Compute JK's market share in the business market.

e) Current products available in the market are (JK, 30K, $40, Black), (Goodyear, 40K, $60, White), and (Michelin, 50K, $50, Black).  JK wants to replace its current product (JK, 30K, $40, Black) with new product (**JK**, **40K**, choose_price, **Black**) and is contemplating on price. If the marginal cost is $25 (mc is constant and same for all products) and the total market size is million units per year.  What price would you suggest to JK for its new tire? (Assume that the same product serves both retail and business markets).

*Hint: Use excel to calculate market share of (**JK, 40K, choose_price, Black**), (Goodyear, 40K, $60, White), and (Michelin, 50K, $50, Black) in both markets. Maximize profit with respect to choose_price where Profit= (choose_price - mc)\*market share*