Práctica 4
Regresión Múltiple. Especificación. Información Cualitativa

Estadística-II. INTRODUCCIÓN a la ECONOMETRÍA. UC3M

1. (Exercise 6.13) Use the data in VOTE1.RAW for this exercise.

   a) Consider a model with an interaction between expenditures:

   $$voteA = \beta_0 + \beta_1 prtystrA + \beta_2 expendA + \beta_3 expendB + \beta_4 expendA \cdot expendB + u. \tag{1}$$

   What is the partial effect of $expendB$ on $voteA$, holding $prtystrA$ and $expendA$ fixed? What is the partial effect of $expendA$ on $voteA$? Is the expected sign for β_4 obvious?

   b) Estimate the equation in part (a) and report the results in the usual form. Is the interaction term statistically significant?

   c) Find the average of $expendA$ in the sample. Fix $expendA$ at 300 (for $300,000$). What is the estimated effect of another $100,000$ dollars spent by Candidate B on $voteA$? Is this a large effect?

   d) Now fix $expendB$ at 100. What is the estimated effect of $\Delta expendA = 100$ on $voteA$. Does this make sense?

   e) Now estimate a model that replaces the interaction with $shareA$, Candidate A's percentage share of total campaign expenditures. Does it make sense to hold both $expendA$ and $expendB$ fixed, while changing $shareA$?

   f) In the model from part (e), find the partial effect of $expendB$ on $voteA$, holding $prtystrA$ and $expendA$ fixed. Evaluate this at $expendA = 300$ and $expendB = 0$ and comment on the results.

2. (Exercise 7.18 in Spanish version, 2006) Use the data in NBASAL for this exercise.

   a) Consider a linear model to relate for the points per match (*points*) with experience in the league (*exper*) and the post in the team (*guard*, *forward*, or *center*):

   $$points = \beta_0 + \beta_1 exper + \beta_2 exper^2 + \beta_3 guard + \beta_4 forward + u.$$

   The equation includes a quadratic term to capture the effect of *exper* and center players are the group of reference.
   Why cannot we include all three dummies *guard*, *forward* and *center* in the regression?

   b) For a fixed level of experience, does a guard score more than a center player? How many more? Is the difference statistically significant?

   c) Consider adding marriage status dummy, *marr*, to the regression,

   $$points = \beta_0 + \beta_1 exper + \beta_2 exper^2 + \beta_3 guard + \beta_4 forward + \beta_5 marr + u,$$

   where $marr_i = 1$ if player i is married. Keeping post and experience constant, are married players more productive (in terms of points per match)?

   d) Now consider an interaction term between marriage status and the two experience variables,

   $$\begin{aligned} points \;=\;& \beta_0 + \beta_1 exper + \beta_2 exper^2 + \beta_3 guard + \beta_4 forward \\ & + \beta_5 marr + \beta_6 marr \cdot exper + \beta_7 marr * exper^2 + u. \end{aligned}$$

   Estimate the model with the following new variables:

   $$\begin{aligned} m1 \;&=\; marr \cdot exper \\ m2 \;&=\; marr * exper^2. \end{aligned}$$

   e) We want to test with the model from part (*d*) whther there is strong evidence that marriage status has an effect on the pòints scored per match by a player, that is:
   $$H_0 : \beta_5 = 0, \beta_6 = 0, \beta_7 = 0$$

   Use the F test:
   $$F = \frac{SCE_r - SCE_{nr}}{SCE_{nr}} \frac{n - 7 - 1}{3}.$$

   f) Change the model in part (*a*) so that the effect of marriage status is different for each position in the game and test whther marriage status help explaining the player's performance.
   ▶ What is the difference in performance between married center and single forward players?
   ▶ And between married guards and single forward players?