WESS ECONOMETRICS

Exercise Sheet 5

1.   Using data from the US, a researcher estimates a model for happiness, measured on a scale of 1-6, for a sample of 241 full-time working males estimated by OLS.

$$\widehat{\ln(h_i)} = 0.86 + 0.115\ln(w_i) - 0.056\ln(age_i) + 0.0072[\ln(age_i)]^2 + 0.056m_i$$

    (0.17) (0.065)   (0.024)   (0.002)   (0.031)

$$-0.012nc_i$$

    (0.005)

(1)

   $RSS = 5.826$, $TSS=6.927$

   where: $h=$ Happiness, $w =$ Gross monthly pay (\$000), $age=$Age,

   $m = 1$ if married (or cohabiting), 0 otherwise, $nc =$ Number of children.

   (a)   At the 5% significance level, test the hypothesis that the coefficient on $\ln(w_i)$ is equal to zero.

   (b)   Construct a 90% confidence interval for the true coefficient on $\ln(w_i)$.

   (c)   Find the age level at which hours of housework is a minimum.

2. On 4th June 2012 a random sample of 394 petrol stations were surveyed in Wales and the price of standard unleaded petrol recorded. The following specification has been estimated to try and explain variation in petrol prices using OLS

$$\ln(petrol_i) = \beta_0 + \beta_1\ln(d_i) + \beta_2\ln(npet_i) + \beta_3 den_i + \beta_4 ue_i + \beta_5 A_i + \varepsilon_i$$ (1)

RSS = 5.292.

Where: $petrol =$ Petrol price in £, $d =$ Distance in kilometres to the nearest petrol station owned by a different company, $npet =$ Petrol price charged the nearest petrol station owned by a different company, $den =$ population density per square kilometre measured at the petrol station, $ue =$ unemployment rate (measured in %) in the district around the petrol station, and $A = 1$ if station located on an A-road (or motorway), 0 otherwise.

   (a)   Interpret the coefficient β_4 and β_5.

   (b)   Ten dummy variables were added to equation (1), based on 11 regions of Wales, where Cardiff (located in South Wales) was one region and excluded from the model as the default. The *RSS* from this new equation was 5.001. At the 5% significance level test this model against model (1) being careful to outline the null and alternative hypotheses.

(c) Four dummy variables were added to equation (1), for: West Wales (made up of 2 regions), North Wales (made up of 3 regions), East Wales (made up of 2 regions) and Swansea (also located in South Wales and defined as a region). The RSS from this new equation was 5.113 At the 5% significance level, test this model against that in (b), being careful to outline the null and alternative hypotheses.