BS2280 – Econometrics I
Homework 10: Nonlinear Models and Transformation of Variables II

1

The output shows the result of regression of $WEIGHT04$ (in pounds) on $HEIGHT$ (in inches) and its square, $HEIGHTSQ$. Provide an interpretation of the regression results.

```
> EAWE21$HEIGHTSQ <- EAWE21$HEIGHT^2
> WEIGHTfit <- lm(WEIGHT04~HEIGHT+HEIGHTSQ, data=EAWE21)
> summary(WEIGHTfit)

Call:
lm(formula = WEIGHT04 ~ HEIGHT + HEIGHTSQ, data = EAWE21)

Residuals:
    Min      1Q  Median      3Q     Max
-62.986 -22.986  -8.206  16.909 132.379

Coefficients:
              Estimate  Std. Error t value Pr(>|t|)
(Intercept) -132.556566  388.924367  -0.341    0.733
HEIGHT         3.758453   11.446696   0.328    0.743
HEIGHTSQ       0.009659    0.084018   0.115    0.909

Residual standard error: 34.61 on 497 degrees of freedom
Multiple R-squared:  0.262,     Adjusted R-squared:  0.259
F-statistic:  88.2 on 2 and 497 DF,  p-value: < 2.2e-16
```

2

Why do economists usually stick with quadratic models, but do not consider cubic, quartic, or a polynomial of even higher order?

3

The output shows the results of regressing the logarithm of hourly earnings in USD on S (educational attainment, in years), EXP (work experience, in years), AGE (in

years), and $SAGE$, an interactive term defined as the product of S and AGE. Derive the marginal effects of the coefficients of S and AGE and calculate their sizes at the mean values for S and AGE. The mean of S is 14.866 and the mean of AGE was 28.932.

```
> EAWE21$LGEARN <- log(EAWE21$EARNINGS)
> EAWE21$SAGE <- EAWE21$S * EAWE21$AGE
> EARNfit <- lm(LGEARN~S+EXP+AGE+SAGE, data=EAWE21)
> summary(EARNfit)

Call:
lm(formula = LGEARN ~ S + EXP + AGE + SAGE, data = EAWE21)

Residuals:
     Min       1Q   Median       3Q      Max
-1.94986 -0.27769  0.01489  0.29884  1.59737

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.962076   2.587967   2.690 0.007383 **
S           -0.290998   0.171287  -1.699 0.089969 .
EXP          0.043710   0.011416   3.829 0.000145 ***
AGE         -0.200335   0.090096  -2.224 0.026629 *
SAGE         0.013263   0.005916   2.242 0.025416 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.5126 on 495 degrees of freedom
Multiple R-squared:  0.1477,    Adjusted R-squared:  0.1408
F-statistic: 21.44 on 4 and 495 DF,  p-value: 2.498e-16
```