

Solutions: Problem Set #7

(1) The regression output and STATA code are provided in the other file.

(1b) To implement this test, we need to get the RSS values from both the restricted and unrestricted models. Note that we *should not use the R-squared version of the joint test here, since TSS is not the same across the restricted and unrestricted models and thus the R-squared version of the test statistic is not valid*. We see that

$$RSS_u = .0672, \quad RSS_r = .0915, \quad p = 1, \quad n - k = 15 - 3 = 12.$$

Thus, our test statistic becomes

$$\frac{(.0915 - .0672)/1}{(.0672)/12} \approx 4.34.$$

The 5 percent critical value from the $F_{1,12}$ distribution is 4.75 (page 648 of your book). So, we fail to reject the null hypothesis of constant returns to scale using this data.

(2) The regression output is provided as a separate attachment.

(2a) Generally the results are consistent with what I would expect. In terms of point estimates, if the spouse earns more, than the female is likely to work fewer weeks. Having a young child in the home has a strong negative effect on female labor supply (the presence of a young child in the home reduces the number of weeks worked by about 9.5). Finally, more educated women and women with higher test scores are likely to work more, holding all else constant.

(2b) If the husband receives a \$20,000 raise, and there are no children in the household, the impact on number of weeks worked will be

$$-.0266(20) = -.53.$$

This is a rather modest reduction in female labor supply corresponding to a rather large increase in spousal salary. Note that in making this calculation, the interaction term is set equal to zero.

(2c) We calculate the same effect as in (2b), but this time set $kids = 1$:

$$-.0266 * 20) - .0951(20) = -2.43.$$

This, though still reasonably small, is a much larger increase than the result given in (2b). It suggests that female labor supply decisions respond more to spousal income when there are children in the household.

(2d) The coefficient on spousal income, with a p -value of .52, is not statistically significant. In other words, we can not reject the null hypothesis that the coefficient on spousal income is equal to zero.

What this means is that spousal income only matters when there are small children in the home. If there are no small children in the home, female labor supply decisions do not appear to be affected by the income of the spouse. Conversely, when there are children in the home, female labor supply is affected by the husband's earnings (since the interaction is significant).