**ECON 6511: Advanced Applied Econometrics**

**Homework 1**

**va7892- Surabhi Asati**

1. **(Wooldridge, C2) Use the data in BARIUM.DTA for this exercise.**
2. Add a linear time trend (t) to equation:  log(chnimp) =β0 + β1 log(chempi) + β2 log(gas) + β3 log(rtwex) + β4befile6 + β5affile6 + β6afdec6  Are any variables, other than the trend, statistically significant?

Adding a linear time trend gives

log(*chnimp*) = 2.37 .686 log(*chempi*) + .466 log(*gas*) + .078 log(*rtwex*) (20.78) (1.240) (.876) (.472) + .090 *befile6* + .097 *affile6* .351 *afdec6* + .013 *t* (.251) (.257) (.282) (.004)

*n* = 131, *R*2 = 0.362, *R*2 = 0.325.

None of the variable are statistically significant. Only trend is statistically significant

1. In the equation estimated above, test for the joint significance of all variables except the time trend. Compute this by hand. What do you conclude?

The *F* statistic for joint significance of all variables except the time trend is .53

The *df* in the *F* distribution = 6 and 123. The *p*-value = .78

Therefore, the variables other than the time trend are jointly very insignificant.

1. Add monthly dummy variables (January is the excluded month) to this equation and test for seasonality. Does including the monthly dummies change any other estimates or their standard errors in important ways?

No change. The *p*-value for the test of joint significance of all variables except the trend and monthly dummies is about 0.76

The 11 monthly dummies are not jointly significant as *p*-value ≈.58

1. **(Wooldridge, C5) Use the data in EZANDERS.DTA for this exercise. The data are on monthly unemployment claims in Anderson Township in Indiana, from January 1980 through November 1988. In 1984, an enterprise zone (EZ) was located in Anderson (as well as other cities in Indiana).**
2. Regress log(uclmns) on a linear (annual) time trend and 11 monthly dummy variables (exclude January). What was the overall trend in unemployment claims over this pe- riod? (Interpret the coefficient on the time trend.) Is there evidence of seasonality in unemployment claims?

The coefficient on the time trend = .0139 (se ≈ .0012), i.e. monthly unemployment claims fell by about 1.4% per month on average. The trend is very significant.

For 6 of the 11 monthly dummy variables with absolute *t* statistics greater than 2, there is strong seasonality in unemployment claims.

Fstatistic for joint significance of the 11 monthly dummies *p*-value ≈ .0009.

1. Addez, a dummy variable equal to1in the months AndersonhadanEZ, to the regression above. Does having the enterprise zone seem to decrease unemployment claims? By how much? (Use the accurate formula from Chapter 7.)

Adding ez to the regression, coefficient = .508 (se ≈ .146).

1. **(Wooldridge, C10) Consider the model: i3t =β0 +β1inft +β2deft +ut  where i3 is the three-month T-bill rate, inf is the annual inflation rate based on the CPI, and def is the federal budget deficit as a percentage of GDP. Use the data in INTDEF.DTA.  1**
2. Find the correlation between inf and def over this sample period and comment.

The correlation between *inf* and *def* is about .098, which is prettysmall. It could indicate that inflation and the deficit rate are uncorrelated over this period. Answer: Not correlated.

1. Add a single lag of inf and def to the equation and report the results in equation form.

The equation with the lags is

i3t = 1.61 + 0.343 inft + 0.382 inft-1 - 0.190 deft + 0.569 deft-1 (0.40) (0.125) (0.134) (0.221) (0.197)

n = 55, R2 = 0.685, R2 =0.660.

1. Compare the estimated LRP for the effect of inflation with that in the original equation without lags. Are they vastly different?

The estimated LRP of *i*3 with respect to *inf* is .343 + .382 = .725, that is greater than 0.606. the estimates are close considering the size and significance of the coefficient on *inft*-1.

**4. (Wooldridge, C13) Use the data in MINWAGE.DTA for this exercise. In particular, use the employment and wage series for sector 232 (Men’s and Boys’ Furnishings). The variable gwage232 is the monthly growth (change in logs) in the average wage in sector 232, gemp232 is the growth in employment in sector 232, gmwage is the growth in the federal minimum wage, and gcpi is the growth in the (urban) Consumer Prince Index.**

(a)  Run the regression gwage232 on gmwage, gcpi. Do the sign and magnitude of βˆgmwage make sense to you? Explain. Is gmwage statistically significant?

The estimated equation is

gwage232 = .0022 + .151 gmwage + .244 gcpi

(.0004) (.001) (.082)

n = 611, R = .293

(b)  Add lags 1 through 12 of gmwage to the equation in part (a). Do you think it is necessary to include these lags to estimate the long-run effect of minimum wage growth on wage growth in sector 232? Explain.

Adding 12 lags of gmwage, the sum of coefficients = 0.198, which is

greater than 0.151 obtained from the static regression.

Also, the F statistic for lags 1 through 12 given p-value = 0.058, shows they are jointly statistically significant.

(c)  Run the regression gemp232 on gmwage, gcpi. Does minimum wage growth appear to have a contemporaneous effect on gemp232?

gemp n232 = −0.0004 − 0.0019 gmwage − 0.0055 gcpi

(.0010) (.0228) (.1938)

n = 611, R = .000

The coefficient on gmwage is small with a very small t statistic. In fact, the R-squared is

zero, which means both gmwage and gcpi has no effect on employment growth in sector 232.