

Problem Set #5

I. Time Series

1. The Stata dataset **macro2.dta** contains quarterly data from 1947:1 to 2009:2 on the natural log of four macroeconomic variables. Obtain sample correlograms up to 25 lags for the time series LNPCI (personal consumption expenditures), LNPCI (personal disposable income), LNPROF (profits), and LNDIV (dividends). Use the Stata command **corrgram**. What general pattern do you see? Intuitively, do any of these time series seem to be stationary?

2. For each of these series, find out if these series contain a unit root. Use the Augmented Dickey-Fuller test (**dfuller**) and the Phillips-Perron test (**pperron**). If a unit root exists, how would you characterize such a time series?

3. Since dividends depend on profits, consider the following model:

$$dividends_t = \beta_1 + \beta_2 profits_t + \varepsilon_t$$

a. Would you expect this regression to suffer from spurious regression phenomenon given the evidence from above? Why?

b. Are dividends and profits time series cointegrated? Test for cointegration using Johansen's method (**vecrank**).

c. If, after testing, you find that they are cointegrated, would your answer to (a) change?

II. Panel Data

We want to assess the impact of a beer tax on beer consumption after allowing for the effect of income. The Stata dataset **beertax.dta** contains annual data from 1975 to 2000 for all 50 states and the District of Columbia. We examine the relationship between per capita beer sales to the tax rate and income, all at the state level.

$$beer_i = \beta_1 + \beta_2 tax_i + \beta_3 income_i + u_i$$

1. Estimate the above relationship using OLS.

2. Estimate the above relationship using a panel regression model with fixed effects.

xtreg y x1 x2, fe

3. Estimate the above relationship using a panel regression model with random effects.

xtreg y x1 x2, re

4. Comment on the signs of the coefficient estimates. Are they as you expected?

5. Are the coefficient estimates and significance levels similar across the three models? Are there any differences?

Due Thursday 3 December