

ECON 4160: Seminars autumn semester 2013 - THIRD SEMINAR

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October 3, 2013

1. Download the zip file *KonsData2Nor_old* from the course web page. In this exercise we work with the three variables *LCP*, *LRCa* and *LF*. They are the natural logs of private consumption and income in Norway and *LF* is the natural logarithm of total household wealth.

In this exercise we will attempt to model the three equation system made up of *LC*, *LRCa*, *LF* by means of one conditional model and two marginal models.

- (a) Start with the marginal model for *LRCa*. Specify it as:

$$(1) \quad LRCa_t = \sum_{i=1}^4 a_{RRi} LRCa_{t-i} + const + seasonals + \epsilon_{Rt}$$

and estimate the equation for the sample 1968q2-2004q4. Use recursive OLS.

- i. Investigate the stability of this marginal model for income over the sample. What do you find?
- ii. There are signs of residual autocorrelation for this equation. How might this affect the estimates, for example \hat{a}_{RR1} ?
- iii. Test if the autocorrelation can be explained by omitted variables: Test for omission of four lags of *LC* and *LF*. Remember: do not include the current value of *LC*, and *LF*, just the lags.

(b) Next, consider a marginal model for LF . Specify it as

$$(2) \quad LF_t = a_{FD}LF_{t-1} + \sum_{i=1}^4 a_{FRi}LRCa_{t-i} + \sum_{i=1}^4 a_{FCi}LCP_{t-i} + Const + Seasonals + \epsilon_{Ft}$$

and estimate by recursive OLS for the sample 1968q2-2004q4. Investigate stability of this equation. What do you find?

(c) Finally, estimate a conditional model for LCP :

$$(3) \quad LCP_t = \sum_{i=1}^4 a_{CCi}LCP_{t-1} + \sum_{i=0}^4 a_{CRi}LRCa_{t-i} + \sum_{i=0}^4 a_{CFi}LF_{t-i} + Const + Seasonals + a_{CD}D_t + \epsilon_{Ct}$$

with the same sample size as for the two marginal equations above. D_t is a dummy variable which is 1 in 1969q4, -1 in 1970q1 and 0 otherwise. (Create it in Calculator or Algebra)

- i. Comment on the mis-specification tests for this model
 - ii. Investigate the empirical stability of (3) and use the joint evidence from the estimation of the three equations to characterize income and wealth as strongly exogenous or super exogenous, with respect to the parameters of the conditional consumption function
 - iii. The estimated model in (3) has several irrelevant variables. Try to simplify the conditional model of LCP_t by omitting the irrelevant variables and report your parsimonious equation
- (d) The estimated versions of (1), (2) and (3), or a simplified version of that equation, represents a model of the system. Suppose that you want to estimate the dynamic effects on LCP of a shock income. How can you achieve this?
2. Download the zip file *US_HP_and_RENT*. The file contains the data set *US_pricetorent* in both in7 and xlsx format. Economic theory suggests the following relationship between housing prices, rents and the “user cost” of housing.

$$(4) \quad \frac{PH}{R} = \frac{1}{(1 - \tau_y)(i + \tau_p) - \pi + \delta - E(\text{capital gains})}$$

The expression says that the price (PH) to rent (R) ratio should be proportional to 1 over the user cost of housing (what it costs to live in a house). A semi-logarithmic (not log of the user cost, which may be negative) econometric model of this expression is

$$(5) \quad ph_t = \alpha + \beta_1 r_t + \beta_2 UC_t + \varepsilon_t$$

All the variables are contained in the data file along with a brief variable description.

- (a) Use the Calculator to construct the log of real housing prices, log of real rents and the user cost.
- (b) Start by estimating the model from the beginning of the sample and stop in 1998Q4. Does your estimates support the theoretical model? Are the coefficients stable?
- (c) Now, estimate the model on the full sample, 1980Q1 to 2010Q4. Are the coefficients stable? What may be the reason for your findings? Discuss briefly.