

Spring 2014
Problem Set #3
Due Tuesday Feb 11, 1pm

1. Let y_t be a time series with a constant mean $E(y_t) = \mu$. Show that the sample mean $\bar{y}_T = \frac{1}{T} \sum_{t=1}^T y_t$ is an unbiased estimator for μ .
Hint: When y_t is iid, the unbiasedness of the sample mean is shown in Wooldridge Appendix C. Does the proof change in the time-series case?
2. Let y_t be a time series with a constant mean $E(y_t) = \mu$, constant variance $\text{var}(y_t) = \sigma^2$, and $\text{cov}(y_t, y_j) = 0$ for $t \neq j$. Show that the variance of the sample mean \bar{y}_T is σ^2/T .
Hint: When y_t is iid, this result is shown in Wooldridge, Appendix C (see also Property VAR.3, VAR.4 in Appendix B). Does the proof change in the time-series case?
3. The Census Bureau released data on Housing Starts (look for the report on “New Residential Construction” under Economic Indicators) for December 2013 on Jan 17.
 - (a) What was the number of units of “New Privately-Owned Housing Units Authorized in Permit-Issuing Places” in December 2013 for the U.S.?
 - (b) What was the estimated percentage change for Dec 2013 from Dec 2012 for the U.S.?
 - (c) What was the estimated percentage change for the Midwest region?
 - (d) Notice that the Census Bureau gives confidence intervals for these percentages. Why do you think they do this? What was the confidence interval for the Midwest region? How does this change your interpretation of the estimate?
<http://www.census.gov>
4. The Census Bureau released data on Residential Vacancies and Homeownership on Jan 31
 - (a) What was the rental vacancy rate in the fourth quarter of 2013?
 - (b) What was the change from the third quarter?
 - (c) What is the reported confidence interval for the change?
5. The STATA file “gdp2013.dta” is posted on the course website. It contains quarterly series of U.S. national accounts data, from 1947q2 through 2013q4. All are real percent changes from the previous period, seasonally adjusted. The time index is “time”.
 - (a) The series “pce_nondurables” is personal consumption expenditures on nondurable goods. Estimate the mean of the series, and plot the series along with the fitted mean.
 - (b) Using the constant mean model, generate point and interval forecasts for nondurables for the next 4 quarters. Plot your forecasts.