

## Problem Set V

14.32: Spring 2003

A. Wooldridge: 8.2, 10.1, 10.5

B. The class website provides a dataset on mortgage loan approvals. We wish to see how loan approvals (measured by the *approve* dummy which equals 1 if loan is approved) is related to the personal characteristics of the applicants.

1. Regress the approval decision on dummies for whether the applicant was white (*white*) and whether the applicant was self-employed (*self*), as well as a variable measuring other obligations as a percentage of income (*obrat*).

2. Re-run the regression in (1) after including an interaction between the white dummy and the self-employed dummy. What is the difference in the probability of approval between a non-white self-employed applicant and a non-white non-self-employed applicant? Between a white self-employed applicant and a white non-self-employed applicant? What does the difference of these two differences represent? Is this statistically significant?

3. Test whether the impact of self-employment and other obligations on loan approval differs for white applicants compared to non-white applicants. Do this in two ways: (i) by running one regression in SAS and using an appropriate TEST statement and (ii) by running two regressions: one unrestricted and one restricted and computing the F-statistic yourself. What degrees of freedom does this F-statistic have?

C. Go back to the wine dataset you used in PS II and PS III, and answer the following questions.

1. Is it plausible that serial correlation is an issue here? Explain your reasoning.

2. Test for serial correlation in a model relating price to vintage for Chateau Latour 1952-1983, including regressors for summer rain and temperature (use the DW option on the MODEL statement).

D. A classic time-series relationship in macroeconomics is the Keynesian Consumption Function, which is the regression of per-capita consumption on per-capita disposable income and, perhaps, other stuff. The marginal propensity to consume (MPC) is the coefficient on income in this regression. Ideally (i.e. if the Keynesian model is correct), the MPC tells us how much of an additional dollar of income individuals will spend and how much they will save.

1. Collect quarterly data on real personal disposable income and real per-capita consumption of nondurable goods and services since 1980. (You can find this online at several places: try the websites maintained by the Bureau of Economic Analysis or the Federal Reserve Board

or other government agencies.

2. Estimate the MPC, including quarter dummies in your model to account for seasonal effects. Report the estimate, its standard error, the Durbin-Watson statistic, and the coefficient of first-order serial correlation. Is there evidence of serial correlation in these data?

3. Correct for serial correlation by quasi-differencing. Report the new MPC and its standard error. What is the DW statistic in the quasi-differenced model?

4. Estimate the unrestricted model we discussed in class and test (informally) for the common factor restriction. Based on this analysis, does AR(1) look like a good model for the residuals?

5. Comment on the economic interpretation of your estimates of the MPC. Does it have a sign and magnitude that seems reasonable? If it does not, suggest some reasons why this might be so.