Specimen mid-term exam 2008-2009.

Examination time $\boxed{\text{1 hour}}$.

Answer one (out of the three) question. Each part of the question carries equal weight.

1. i) Explain how an applied economist can test the two legs of the Friedman hypothesis.

ii) Analyze the causal effect of real (growth) uncertainty on output growth.

iii) The following sums were obtained from 10 sets of observations (in terms of deviations from the mean) on y (output growth), σ_y (growth uncertainty), and σ_π (inflation uncertainty):

$$\begin{aligned} \sum y^2 &= 48.2,\ \sum \sigma_y^2 = 2, \\ \sum \sigma_\pi^2 &= 3,\ \sum \sigma_y \sigma_\pi = -1, \\ \sum y\sigma_y &= -1,\ \sum y\sigma_\pi = 8. \end{aligned}$$

In addition, when we regress y on σ_y and σ_π the RSS (residual sum of squares) is 3.6. Calculate

a) the standard error of the regression.

b) the variances and covariances of the two estimated slope coefficients.

2. i) Let π and u denote inflation and unemployment rate respectively. The following sums were obtained: $\sum \pi u = 70$, $\sum u^2 = 40$ and $\sum \pi^2 = 124$ (where the variables are expressed in terms of deviations from the sample mean). Calculate the sample correlation coefficient between inflation and unemployment rate ($r_{\pi u}$), and the estimated slope coefficient from the regression of π on u ($\beta_{\pi u}$).

ii) Let $\beta_{u\pi}$ be the estimated slope coefficient from the regression of u on π. Write an equation that relates $r_{\pi u}$, $\beta_{\pi u}$ and $\beta_{u\pi}$.

iii) Assume that inflation is a linear combination of the unemployment rate. Prove that ρ (the theoretical correlation coefficient) between the two variables is 1.

iv) Present three alternative inflation/unemployment rate regressions.

3. i) Explain how we might use the Breusch-Godfrey statistic to test estimated residuals for serial correlation.

ii) Explain how we might use White statistic to test for the presence of heteroscedasticity in the estimated residuals.

iii) Explain Ramsey's reset test of specification error.

iv) An investigator regress stock volatility on a constant and on stock trading volume. The values of six test statistics are shown in table 1. Discuss the results. Is the above regression correctly specified?

Table 1.

Test statistic	p-value
Breusch-Pagan test	0.03
Box-Pierce Statistic on Squared Residuals	0.03
Jarque-Bera statistic	0.01
Breusch-Godfrey test	0.15
Ramsey test statistic	0.03
White test	0.06