

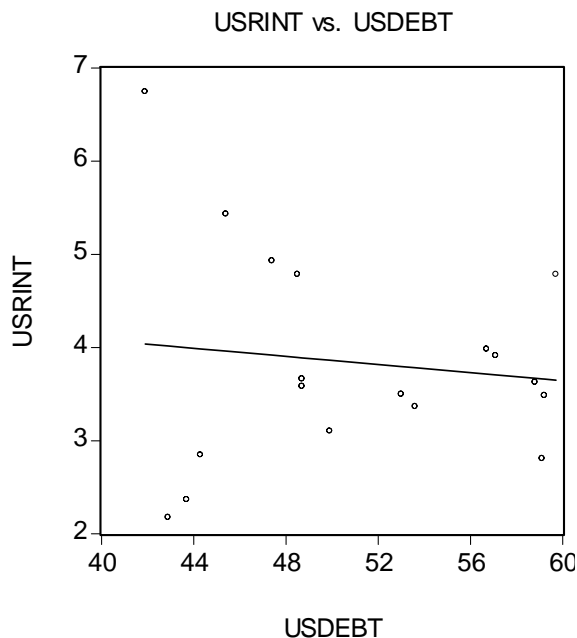
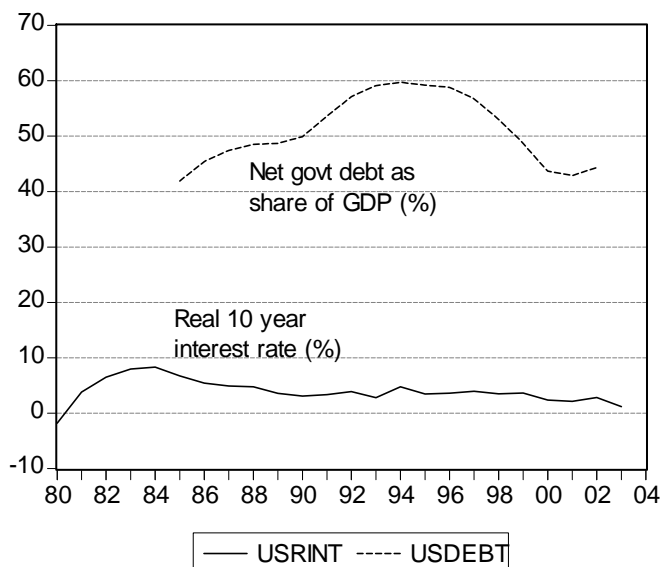
### Problem Set 5

This problem set is due in lecture on **Monday, December 8th**. No late problem sets will be accepted. **Be sure to show your work** (that is, do not use a spreadsheet or statistical program to generate your answers), and to write your name, ID number, as well as the name of your Teaching Assistant, on your problem set.

Answer all these problems. They are from the textbook, with the exception of Problem W which is written out.

- 8.70
- 9.20
- 10.22
- 8.82
- 9.28
- 10.30
- 9.2
- 9.34
- 9.4
- 9.72
- 9.6
- 10.10

Problem W. Below are data for the United States over the 1980 to 2004 period. In graph 1, the US real interest rate, *USRINT*, (the nominal yield on 10 year constant maturity government bonds, subtracting off the lagged one year CPI inflation rate) and the net government debt as a share of gross domestic product, *USDEBT*, are plotted (in percent). In Figure 2, a scatterplot is presented, along with a bivariate regression line.



Dependent Variable: USRINT

Method: Least Squares

Date: 11/24/03 Time: 20:31

Sample(adjusted): 1985 2002

Included observations: 18 after adjusting endpoints

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| C                  | 4.949735    | 2.336725              | 2.118236    | 0.0502   |
| USDEBT             | -0.021767   | 0.045470              | -0.478715   | 0.6386   |
| R-squared          | 0.014121    | Mean dependent var    |             | 3.838888 |
| Adjusted R-squared | -0.047497   | S.D. dependent var    |             | 1.140295 |
| S.E. of regression | 1.167061    | Akaike info criterion |             | 3.251294 |
| Sum squared resid  | 21.79251    | Schwarz criterion     |             | 3.350224 |
| Log likelihood     | -27.26165   | F-statistic           |             | 0.229168 |
| Durbin-Watson stat | 0.625861    | Prob(F-statistic)     |             | 0.638618 |

- In words, interpret the coefficient on *USDEBT*.
- Conduct a two-sided t-test using a 5% significance level.
- Calculate the standard error of the regression, using the statistics reported in the output (show your work!).
- Calculate the value of the “S.E. of regression” using the “Sum of squared resid” (also termed the Sum of Squared Errors in the textbook).
- Calculate the R-squared using the values for SSE and the “S.D. dependent var” (which is the standard deviation of the dependent variable).

Suppose you believe that not only does today’s debt matter, but also additional debt the government is expected to incur over the next two years (*USDEBT\_2-USDEBT\_0*), as well as the state of the economy (*USGAP*). Then the following regression might be estimated:

Dependent Variable: USRINT

Method: Least Squares

Date: 11/24/03 Time: 20:45

Sample(adjusted): 1988 2002

Included observations: 15 after adjusting endpoints

| Variable              | Coefficient | Std. Error            | t-Statistic | Prob.    |
|-----------------------|-------------|-----------------------|-------------|----------|
| C                     | 0.205692    | 1.603793              | 0.128253    | 0.9003   |
| USDEBT                | 0.065595    | 0.030105              | 2.178859    | 0.0520   |
| USDEBT_2-<br>USDEBT_0 | 0.151589    | 0.084782              | 1.787993    | 0.1013   |
| USGAP                 | 0.373826    | 0.167481              | 2.232059    | 0.0474   |
| R-squared             | 0.491138    | Mean dependent var    |             | 3.466149 |
| Adjusted R-squared    | 0.352358    | S.D. dependent var    |             | 0.748689 |
| S.E. of regression    | 0.602517    | Akaike info criterion |             | 2.047776 |
| Sum squared resid     | 3.993292    | Schwarz criterion     |             | 2.236590 |
| Log likelihood        | -11.35832   | F-statistic           |             | 3.538961 |
| Durbin-Watson stat    | 2.175840    | Prob(F-statistic)     |             | 0.051746 |

- Interpret the coefficient on *USDEBT*.
- Calculate the standard error of the regression, using the statistics reported in the output (again, show your work!).
- Form a 95% confidence interval around the coefficient on (*USDEBT\_2-USDEBT\_0*).