BOSTON COLLEGE
Department of Economics

EC761: Econometrics II
Fall 1998
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PROBLEM SET THREE
due at classtime, 16 October 1998

Do the following empirical exercises with RATS 4.30 on fmrisc.bc.edu. The RATS manual may be found in C-138. Additional information on RATS syntax is available in PDF format on the course home page. If you have difficulties with RATS syntax, please email me, indicating the problem, and/or referring to a specific file on your fmrisc account.

(1) Read the dataset containing daily stock index returns and the Fed's trade weighted exchange rate, FEDG10, via the following commands. These data have not been stored with a timeseries calendar, but you should use the calendar instruction to enable timeseries tests.

```
CAL(IRREGULAR)
ALL 1770
OPEN DATA /u/baum/761/761rets.rdb
DATA(FOR=RATS)
TAB
```

The FEDG10 series is the Federal Reserve trade-weighted value of the dollar (an index) versus G-10 trading partners. The SPRETN series is the daily return on the S&P 500 from CRSP, expressed as a percentage. The DR1…DR10 are returns on decile portfolios of NYSE/AMEX stocks (a broader measure than the S&P 500), where the deciles are based on market capitalization (decile #1 contains the largest-cap firms, etc.)

(2) For each of the decile returns series, run a 10^{th}-order autoregression, and examine the residual series' independence via the Ljung-Box test. [Hint: you may find the DOFOR command useful in this context.]

(3) Use Durbin's cumulated periodogram test (as described on p.6-9 of the RATS manual) to perform a nonparametric (Komolgorov-Smirnov) test for nonindependence in each of the decile returns' residual series. CUMPDGM.SRC may be SOURCEd from /usr/local/rats/examples. [Hint: if you ALLOC ten numbered series, you can store the residuals generated in (2) for use here.]

(4) Rerun these models of decile returns adding once-lagged S&P 500 returns as an additional regressor. Does it significantly contribute to the explanatory

power of the model? Does this change your conclusions about independence of these series (via the Q-test)?

(5) Rerun the models of decile returns estimated in (4) adding the lagged level of log(FEDG10). Does it play a meaningful role in explaining decile returns? In generating independent errors (via the Q-test)?

(6) Estimate the seemingly unrelated regression (SUR) estimator on the ten equations defined in (5). How do the systems estimates differ from the single-equation estimates? [Hint: the DEFINE=I option on the linreg command in (5) will be useful, as will LIST and CARDS.]

(7) Reestimate the SUR system subject to the restriction that the coefficient on log(FEDG10) is constant across equations, and perform a likelihood ratio test of the restrictions. [Hint: see %logdet under SUR, and the CDF command; alternatively, save residuals from each SUR's equations and use the RATIO command.]