

Econ 327 – Spring 2010
Introduction to Econometrics
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Assignment Three
Due Thursday Apr 8, 2010

Data for this problem are in the Econ327 class folder (under data) with the name Assignment3data. The data are monthly from 1980 to 1989.

The variables in the dataset are:

REALMONEY, INCOME, SHORTRATE, MEDRATE, LONGRATE

The series REALMONEY is the monthly demand for real money services. Monetary theory argues that people demand the real services (purchasing power) of money. Accordingly, the dependent variable must be expressed in real terms and transformed into logs to suppress any large changes in size swings (variance). Therefore, monthly REALMONEY is calculated as follows (where CPI is the consumer price index):

$$\text{REALMONEY} = \ln(M1/\text{CPI})$$

The series INCOME is the log of seasonally adjusted Personal Income.

Note: The demand for money and income series are both log transformations of the original data (to suppress large changes in size swings – variance)

The series SHORTRATE is the Federal Funds interest rate, which is the rate banks charge on short-term reserves.

The series MEDRATE is Municipal Bond yield and represents the average rate of a portfolio of municipal notes.

The series LONGRATE is the Mortgage interest rate representing the average fixed mortgage interest rate.

Note: the interest rate variables are named according to their relative average maturity.

Explaining the Demand for Money

Nobel prize winner Milton Friedman is considered by many as the father of the "Monetarist" school of economic thought, which arose as a challenge to modern Keynesian macroeconomics in the late 1960s. Friedman argued that the supply of money effectively determined all nominal

prices, and monetary policy was an effective tool of stabilization policy. Central to Friedman's arguments was the assumption that the demand for money was stable, or at least, predictable. This led empirical researchers to develop forecasting models of the demand for money for purposes of macroeconomic forecasting.

The conventional theory of the demand for money concentrates on two motives for holding money:

- 1) People demand money to facilitate transactions, termed the Transactions Motive. Accordingly, the demand for money should have a positive correlation with Personal Income (a measure of aggregate economic activity).
- 2) Since money is an asset with special properties, the demand for money should be inversely related to the yields on substitute assets. This approach, termed the Portfolio Motive suggests that the demand for money is negatively related to interest rates and yields on substitute assets.

We can summarize these factors in a function, explaining behavior of the demand for money:

$$\text{Real Demand for Money} = f(\text{Income, Shortrate, Medrate, Longrate}),$$

We should expect the slope coefficient on the income variable to be positive, whereas the slope coefficients on the interest rate variables should all be negative.

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- 1) Estimate the demand for money using Eviews. Report your results.
 - 2) Do the coefficients on the interest rate variables have the correct signs? Can we reject the null that their respective slopes are zero using a two-tailed test with significance level of 5 percent?

(Note - any multiple regression estimated with three different interest rate variables as independent variables is likely to be plagued by multicollinearity. Specifically, since interest rates tend to be highly correlated, OLS regression should produce large errors, i.e., unreliable results.)

Examine for possible multicollinearity by estimating the linear correlation matrix of the variables.

- 3) Based upon the regression results you obtain and the correlation matrix of interest rates, is multicollinearity a problem in your model? Explain (Be sure to mention the F-test.)

A way to correct for multicollinearity is to change model specification. This can be done through refining the variables or dropping redundant variables. Specifically, since all three interest-rate variables measure the same impact (the cost of credit), try estimating the model with only one interest rate.

- 4) Does the coefficient on the SHORTRATE variable now have the correct sign? Can we reject the null that this coefficient is zero at the 95 percent level of confidence? Which model specification is superior?
- 5) Redo the assignment with the addition of an international variable to the list of explanatory variables used to predict the demand for money. Specifically, does the addition of the exchange rate or the trade balance increase your ability to forecast the demand for money? (Note: The fact that foreign interests influence the U.S. demand for money is a serious issue to monetary authorities).
- 6) Select three macroeconomic variables at random and add to the explanatory variables used to predict the demand for money. Redo the regression with all the independent variables, including the three new ones. Contrast and compare the R^2 and AIC and SIC statistics between the two regressions. Comment.